HARI HARI

A STUDY OF LAND USE

AND A COMMUNITY

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HARI HARI - A STUDY OF LAND USE AND A COMMUNITY

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CORRIGENDA

Please note the following corrections:

Page 103, Section 5.2 line 2: After the first sentence insert a new sentence. "The increase has been mainly in the township which in 1976 had a population of 543, over four times that of 30 years ago."

Page 103, Section 5.2 line 13: Appendix B Should read Appendix E
Page 103, Section 5.2 Line 14: 610 should read 556.

Page 105, Table 12: The following footnote relating to sawmilling, line 3, should be added. "A further 12 employees commute from Whataroa, Waitaha and Ross each day."

Page 110, Table 13, line 2: 16 should read 6 and 63 should read 53.
Page 110, Table 13, line 4: 145 should read 135.

Page 118, Section 6.1.2 line 4: 17% should read 19%
Page 118, Section 6.1.2 line 5: 610 should read 556 and Appendix D, should read Appendix E.

Page 264, line 9; should read: "Estimated dependent population
55 x 1.5 = 82.5
Add line 10: Total population loss 82.5 + 55 = 137.5
Add Line 11: Total Estimated 1980 population = 556

S. E. Maturin

ABSTRACT

A multi-disciplinary approach was used to study land use, and the associated community of Hari Hari. Land use decisions concerning forestry and agriculture, were placed in the context of social and economic needs of the human system and ecological requirements of the natural system.

Data was collected from interviews with 17% of the Hari Hari community.

The needs of the community were identified, from a detailed study of the Hari Hari people.

Past and present land uses were studied in detail to determine the suitability of each land use, and its ability to work within the constraints imposed by the natural system.

Future land use options and their social, economic and ecological implications were outlined. The most appropriate options were selected, according to their ability to satisfy the needs of the community, and ecological requirements of the natural systems.

Appropriate options for agriculture included the following:

a. continuing as at present; and,
b. increasing farm management efficiency; and,
c. diversification into opossum and deer farming.

These options met ecological requirements and would contribute to community needs.

The most appropriate option for forestry was found to be immediate cessation of production logging until the natural constraints are identified and a logging system which works within these constraints is identified.

This option conflicts with the social need to maintain employment. However the study found that closure of the sawmill would have little impact upon the Hari Hari community, other than a reduction in employment.

Possible options for establishing alternative employment activities were suggested. These included a fur industry, an out-door pursuits centre, cottage industries, and ventures which would promote community self-sufficiency.

As a whole, this study emphasised the value of a multi-disciplinary approach to land use planning.

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Chapter One

Introduction

Any land use decision has a wide range of implications. These include economic and social implications, particularly for the people of the area concerned, and ecological implications, in the sense that natural systems may be modified. Consequently, any decision involving land use, requires an integration of a wide range of sciences, from the physical and biological to the social and economic. A multi-disciplinary approach is vital.

This study provides a multi-disciplinary approach to land use planning. It is a case study of land use and the associated community of Hari Hari. It considers future options for land use, and the possible effects of these options on the local people and upon the natural system.

1.0 REASONS FOR THE STUDY:-

To provide a discussion document to be used in conjunction with the Forest Service proposals for the management of South Westland Forests.

In preparing the management proposals, the Forest Service was constrained by Government policy. This policy commits them to continue logging South Westland's forests, to supply sufficient timber to meet the legal commitments to the sawmilling industry. In addition, the forest policy does not permit consideration of all the possible land use options.

The management proposals are restricted to the discussion of forest management only, and do not consider in detail the implications of these decisions upon the local community and economy.

This study is not constrained by Government policy, nor is it limited to discussion of a single land use. Therefore, it is able to investigate all aspects and options for future land use and their effects upon the physical and social environment. Consequently this study raises issues that were not able to be considered in the forest management proposals.

It provides a broad base upon which to discuss future land use and community planning.

1.1 STUDY GOALS

This study aims to present options for future land use,and options for alternative employment to maintain the community when the sawmill closes.

1.2 STUDY OBJECTIVES

i. Land Use Objectives:

First objective:- To understand the history of Hari Hari and to determine how the past has sculptured the present. (Chapter Three).

Second objective:- To understand present land use practices, and the knowledge gained from practical land use experience. (Chapter Four).

Third objective:- To present future options for agriculture and forestry.

ii. Community Objectives:

First objective:- To understand the history of the community and to determine community trends regarding population, employment and businesses and services. (Chapter Three).

Second objective:- To understand the structure and characteristics of the Hari Hari community. (Chapters Five and Six).

Third objective:- To understand the effects of the sawmill closure upon the community and to assess possible alternatives for employment. (Chapter Eight.)

1.3 SOURCES OF DATA

I lived in Hari Hari for four months. During this time I collected data through observation and interviews, with local people and with individuals, in organisations and Government Departments.

The method of interviewing and the local population sample is detailed in Chapter Six.

Written information was obtained from reports from the Forest Service, Wildlife Service, Ministry of Works and Development, Department of Lands and Survey, D.S.I.R. Soil Bureau, and Ministry of Agriculture and Fisheries.

1.4 ASSUMPTIONS

Research was collected on the assumption that the sawmills would close within the next five years. Since this study began, one sawmill has closed, thus hereafter I shall speak of the sawmill.

1.5 STUDY LIMITATIONS

This study is confined to activities within the study boundary. This presents a problem when considering future options for forestry, because there are two sawmills outside the study area, drawing timber from within this area. The options presented take into account the present total cut of timber from within the study area, but the impacts of each option upon the mills outside this area are not considered.

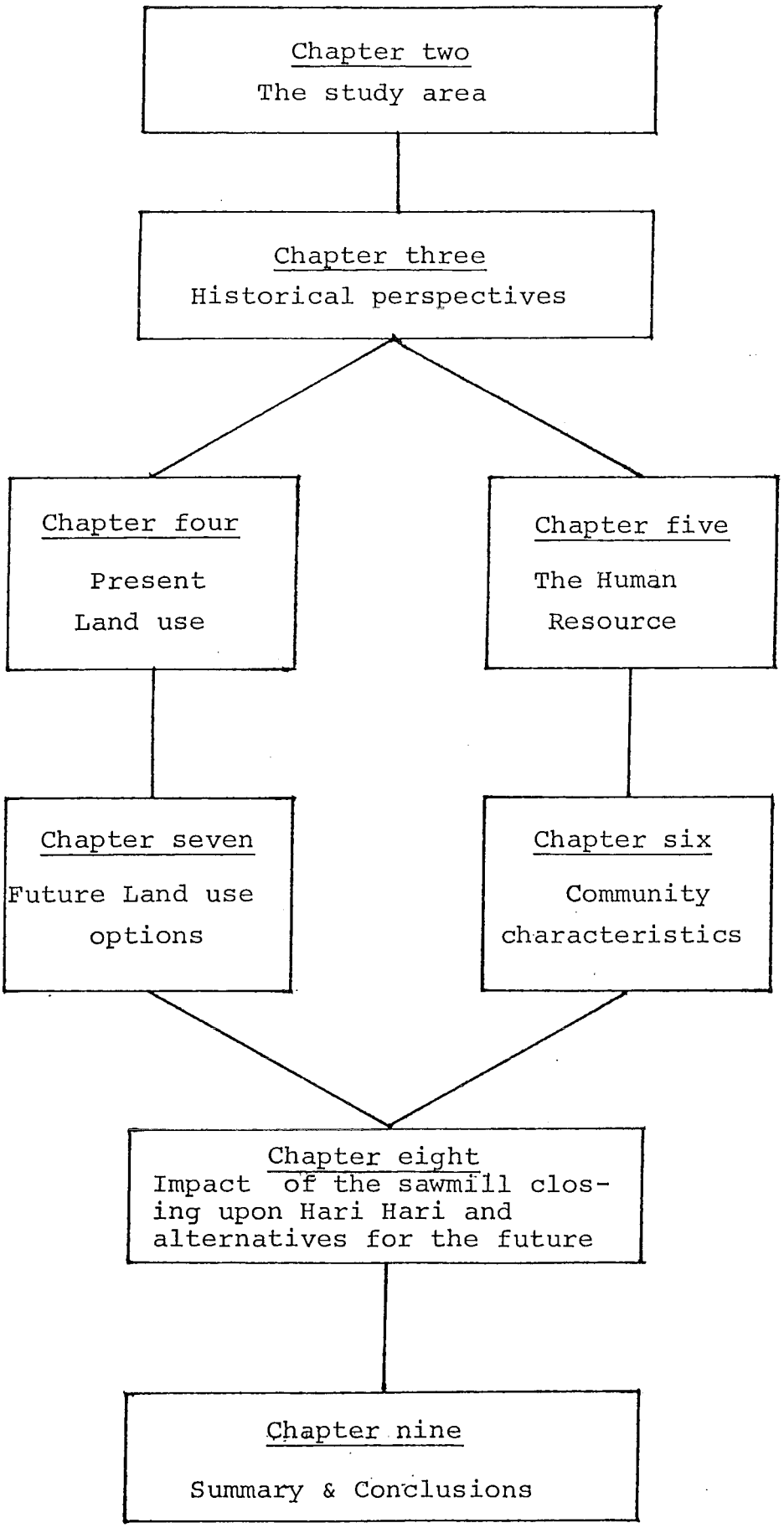
This study is a multi-disciplinary approach to land use planning. An inevitable consequence of this approach is that it is a study in breadth, rather than in detail. This means that it is superficial in some areas. These areas may require further investigation, by others more qualified than I.

1.6 STRUCTURE OF THE REPORT

The chapters are organised in an historical sequence, from the past, through the present, to the future. Chapters Two to Six provide data for Chapter Seven, Land use options and Chapter Eight, Impact of the Sawmill Closing upon the Community and Alternatives for the Future.

The structure of the report is outlined in Figure 1.

Figure 1. STUDY STRUCTURE



Chapter Two

The Study Area

Hari Hari lies in South Westland, 76 kilometers south of Hokitika, (Figure 2).

2.1 STUDY BOUNDARY

The study boundary lies along Duffers Creek in the north, crosses the main highway to follow southwards along the foot of the steep land, until meeting with alpine fault. The boundary then follows the alpine fault south of Mt. Hercules and out to the coast along the southern boundary of Saltwater State Forest, (Figure 3). The total area is approximately 44,000 hectares.

2.2 LAND FORMS

The study area consists of the lower catchments of the Wanganui and Poerua Rivers and contains their wide flood plains and the lowland terraces and hills of the glacial moraines and outwash terraces, (Plates 1 and 2).

Figure 2. Locality Diagram.

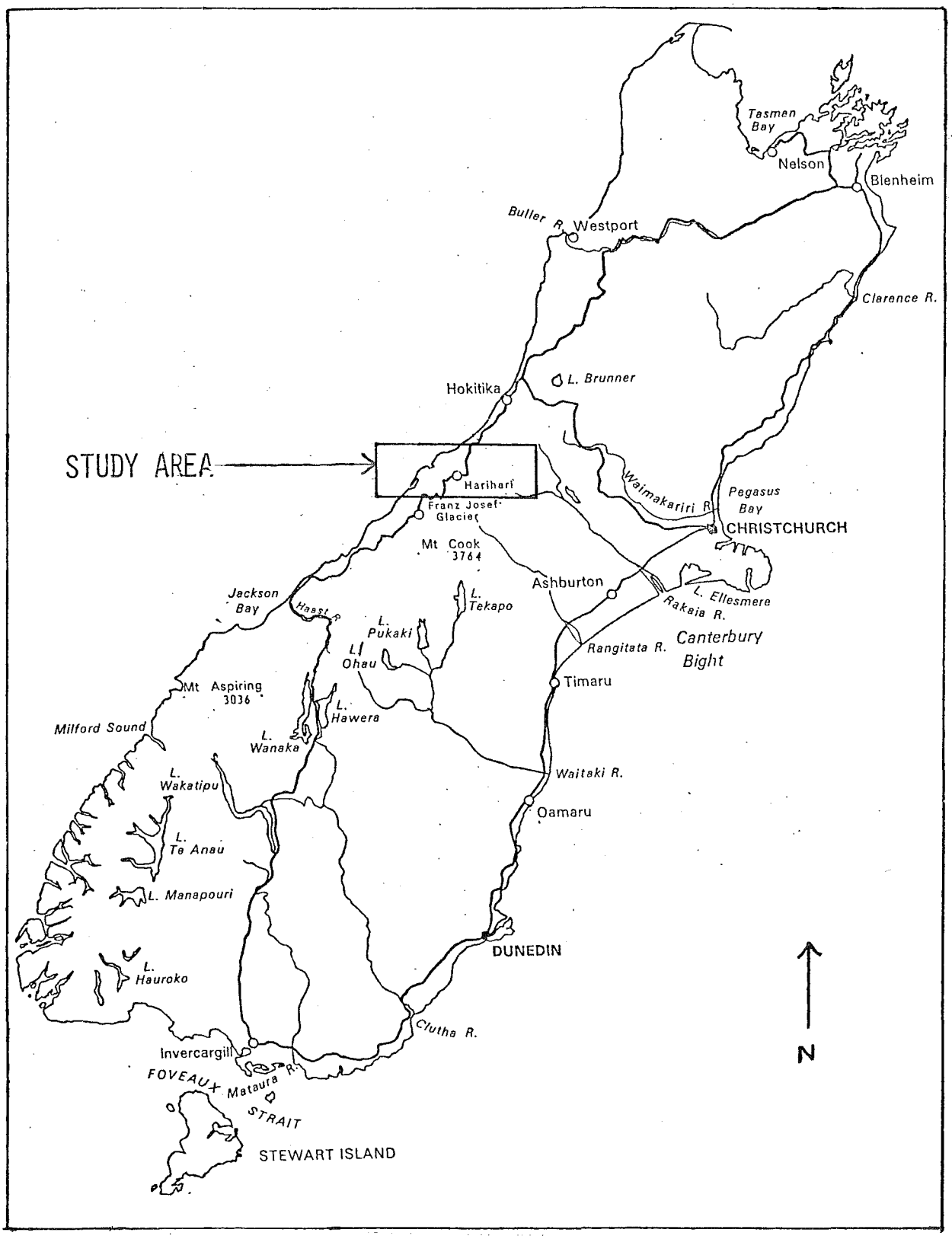
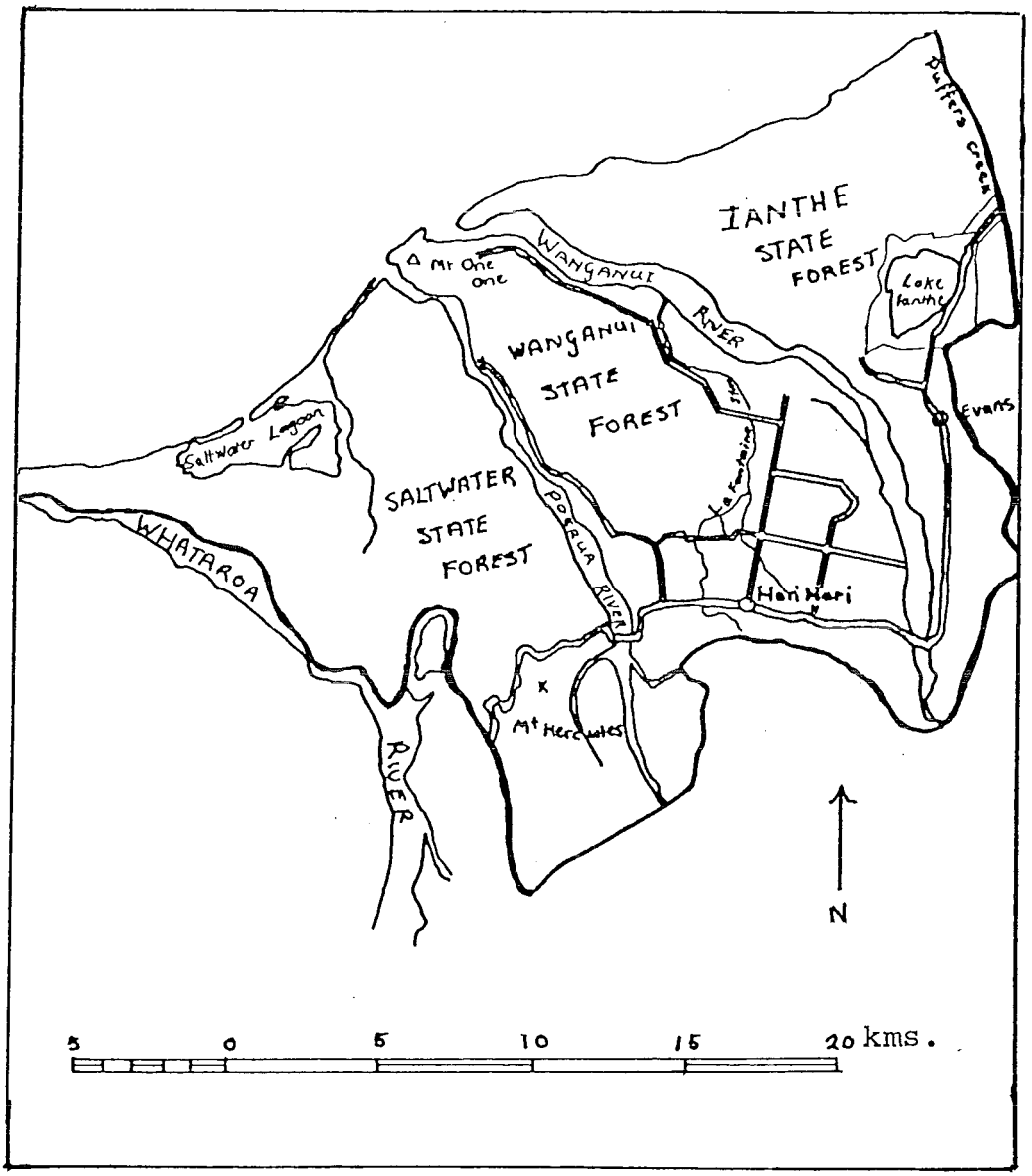


Figure 3. Study Boundary.



Typical features of the coastal area are truncated or jutting glacial moraine headlands, broad beaches and coastal lagoons.

2.3 GEOLOGY AND SOILS

West of the alpine fault, the underlying rocks are largely greywacke and argillites and associated metamorphic rocks. These are mainly overlain with more recent alluvial, glacial and fluvio-glacial deposits.

The soils of the study area fall into three main groups.

i. River flood plains; these are relatively fertile and are now mainly under farm land.

ii. Terrace Soils; these are older soils, characteristically leached, infertile, and often poorly drained.

iii. Hill country soils; these soils, although leached, are more freely draining than the terrace soils.

Appendix A describes the physical resources of the study area in detail.

2.4 CLIMATE

The climate is characterised by a high annual rainfall which ranges from approximately 2,000 mm near the coast to over 8,000 - 10,000 mm over the western slopes of the main divide. There are no distinctive rainy seasons,

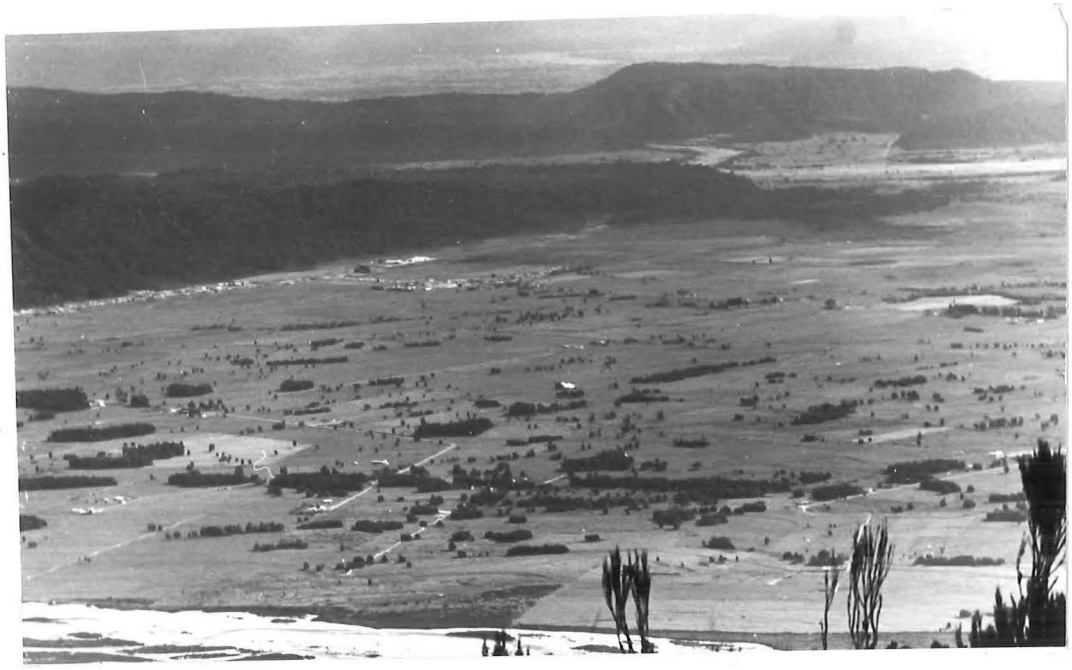


Plate 1. The Hari Hari Flats. (Photo, Sue Maturin)

Plate 2. Low land terraces between the Wanganui and Poeura Rivers. (Photo, A. Griffiths)

although local people regard late spring and early summer as such.

Temperatures are relatively mild and high annual sunshine hours are recorded. (Refer to Appendix A).

2.5 LAND COVER, AND TENURE

Podocarp forests dominate the lowland terraces. These are mainly composed of rimu, with some kahikatea, silver pine, miro, rata and totara.kamahi and quintinia form the lower canopy, and ferns and coprosmas, the shrub layer. The forest floor is covered with grasses, herbs and mosses.
Forests make up 56% of the study area, (Figure 4). (Refer to Appendix A).

The wider flood plains are mainly covered in native and sown pastures. Remnant patches of kahikatea, matai and totara, provide diversity in the cultural landscape, (Plate 3). Pastures make up 20% of the study area.

Land tenure is shown in Figures 5 and 6. The dominant land owner is the Forest Service.

2.6 THE COMMUNITY

Hari Hari has a population of 610, which is made up of families and single people involved with farming, sawmilling, forestry, teaching, Ministry of Works and Development, Power Board and local businesses and services, (Chapter five).

Figure 4. Land Cover - Study Area.

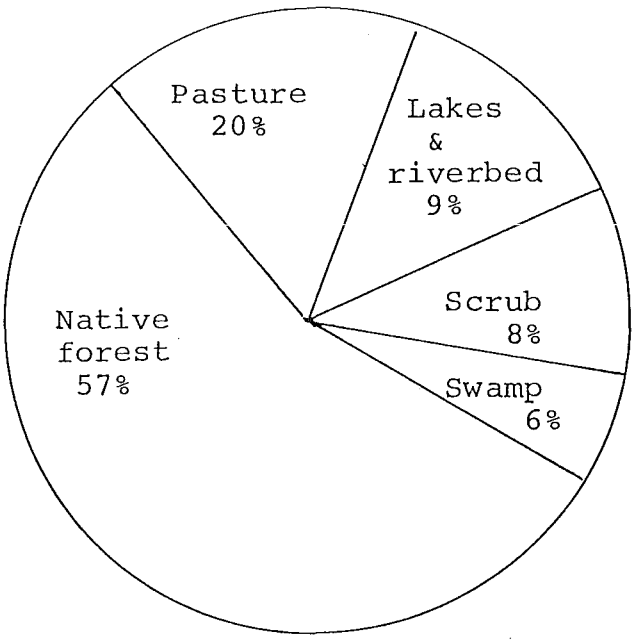
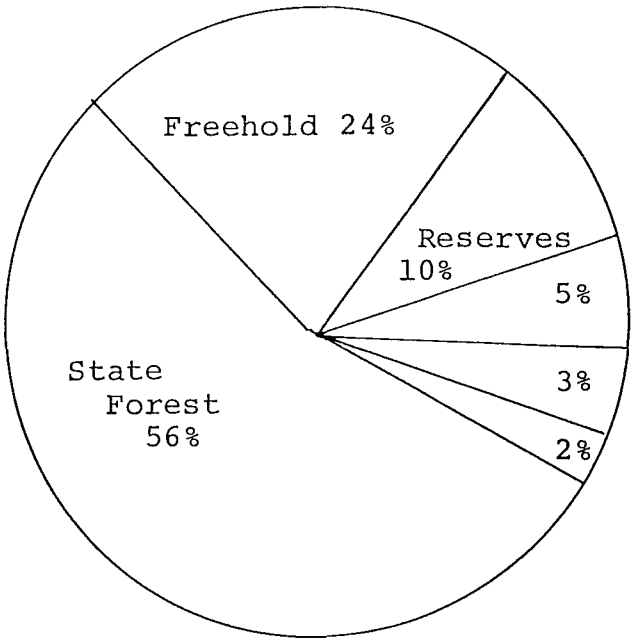
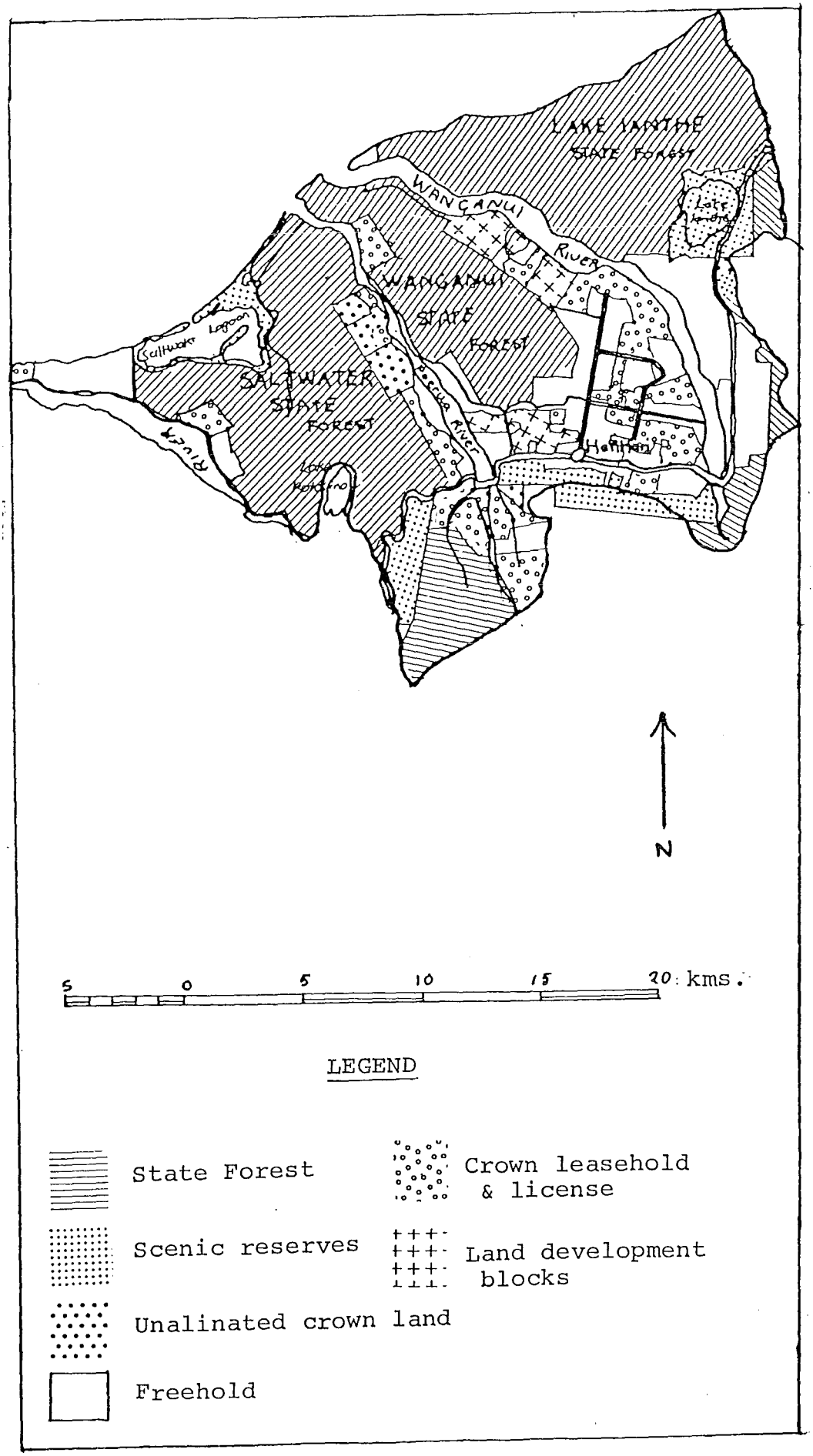


Figure 5. Land Tenure - Study Area.



Source: M.O.W. Land Inventory Work Sheets, (1976).

Figure 6. Land Tenure.



Chapter Three

Historical perspectives

> "Among material resources, the greatest unquestionably is the land. Study how a society uses its land, and you can come to some pretty reliable conclusions as to what its future will be."
>
> (Schumacher, 1973, p.100)

3.0 INTRODUCTION

The way in which the resources of the land have been used in the past, sculptures the present landscape, the characteristics of the community, and the options for future land use.

This chapter describes the history of farming, and sawmilling, and the way in which these activities have influenced community trends, the present landscape, and future land use options.

3.1 Hari Hari Discovered

The first european person to set eyes on the area which was to become Hari Hari, was probably a public works engineer or head surveyor, plotting out a pack track from Ross to Duffers Creek, where gold had been discovered, Lucas, (1975).

Lucas (1975, p.1) wrote -

> "Slashing and struggling through dense trackless bush they eventually reached a vantage point on the hill and gazed out over a scene that could well have taken their breath away. Stretching out from below them was a shimmering sheet of water, sparkling like a priceless jewel set in a carpet of green, and beyond, a river and like a length of rare green velvet, a flat covered in forest."

This distant flat was eventually to become Hari Hari, meaning "a song to make people pull together."

For most of the West Coast, european settlement began with the discovery of gold. However, as gold was not found in the Hari Hari district, it was land that attracted the first european settlers. Many of the early settlers were gold minners who turned to the land, once their gold claims petered out.

Settlement of Hari Hari began in the early 1870's, when two farmers from Kokatahi (north of Hari Hari) brought cattle to Evans Creek.

3.2 History of Farming

Until the late 1890's there were only four families living in the Hari Hari district.

From 1898 to 1907 the Westland Land Board surveyed farm sections. Balloting for these began in 1906.

Farms were surveyed, and subdivided according to what was considered an economic size under semi-extensive grazing practices of the time. As a result, many farms were, and still are from 80 - 202 ha. With such large areas of land, the farmers had little incentive to use their land intensively.

This legacy of farm subdivision pattern is often cited as a reason for low productivity per ha. of Westland farms today.

3.2.1 Development

Wherever possible, land carrying totara was cleared first, as these trees indicated well drained soils, (Plate 4).

There is little documented evidence concerning the process of land development, apart from Muller's statement to the Railway Commission in 1883.

> "As a rule clearing of land means two fires, then you have all the stumps left and must allow them to rot out, or have recourse to grubbing, which is very expensive work, and after that finish up with another burning."
>
> (From McCaskil, 1960, p.61)

Plate 3. Farm landscape - (Photo, Sue Maturin)

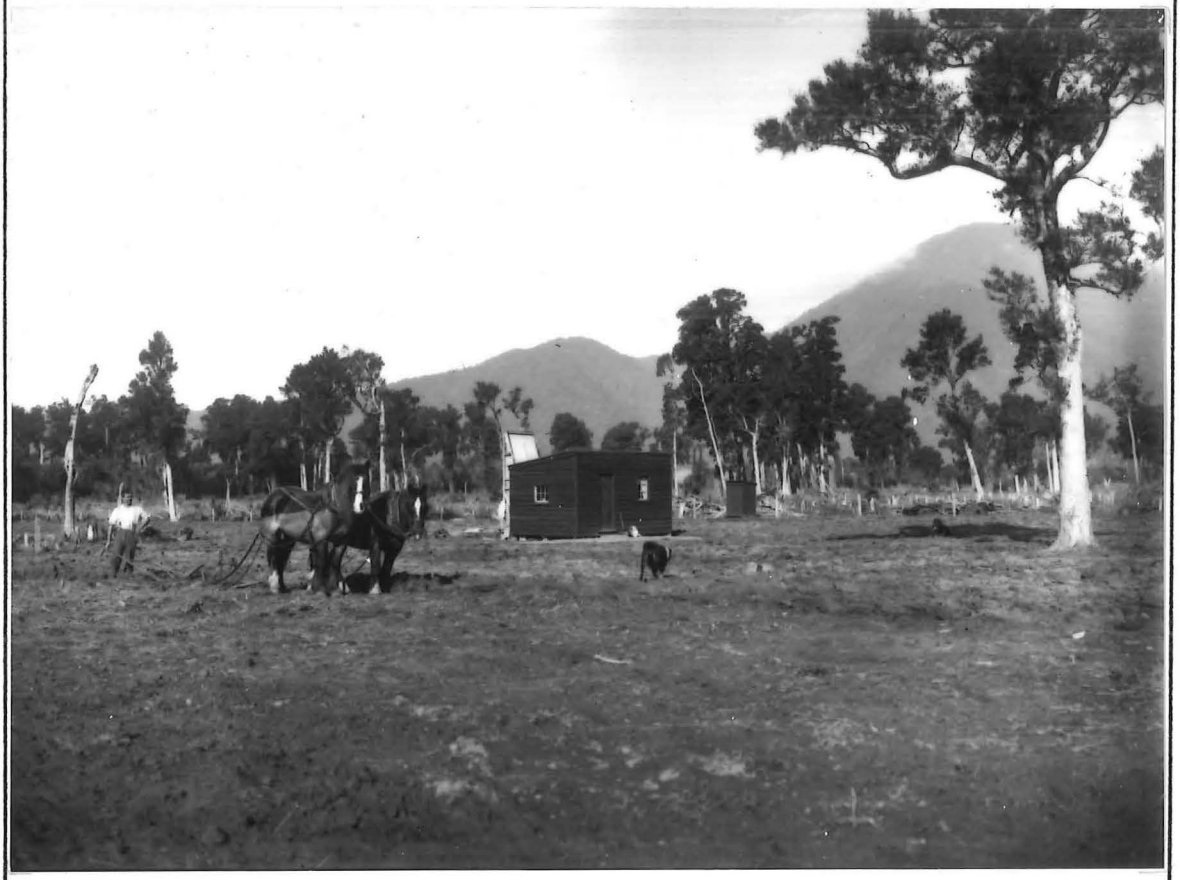


Plate 4. Early land clearing. (Photo,P.C. Lucas)

The burnt over pastures deteriorated in quality after three years, and reverted to rushes, ferns, and exotic weeds. As a consequence farmers, to maintain production, cleared more land, leaving the land already cleared to deteriorate further. Thus a pattern of "shifting and burning" emerged.

Between 1900-1910 the area of improved land, in the Buller, Grey and Westland counties increased by 77%. However, because pastures were poorly managed, and lightly stocked, the numbers of livestock did not increase simultaneously, (McCaskill, (1960).

Although many of the farms were large, they could not be subdivided into two units without substantial capital investment.

The development of farming in Hari Hari received a severe set-back when in 1931 the Wanganui River broke its banks and flowed across the Hari Hari flats. This caused the dairy factory to close for a season.

Since this time, the Wanganui, Poerua Rivers, and the La Fontaine Stream have flooded a number of times.

The success of farming adjacent to these rivers today, is reliant upon continued river protection work.

3.2.2 Stock

Dairy farming has always been important in Hari Hari. In 1909 the Inter Wanganui Dairy Factory was established. This was the fourth butter factory and the first cheese factory on the West Coast, (Plate 5).

Beef and sheep fattening was also important.

3.2.3 Lands and Survey Farm Settlement

There are two farm settlement blocks in Hari Hari, La Fontaine and Duart.

a. La Fontaine -

In 1960 733 ha were purchased by the Department of Lands and Survey. Some 175 ha are now fully improved, leaving 459 ha of peat to be developed. Sheep and cattle are farmed.

b. Duart -

The Duart farm block was purchased in 1961. It comprises 652 hectares,of which 370 ha are farmed for sheep and cattle.

3.3 SAWMILLING

The history of sawmilling in Westland is documented in "Sawmills of the West Coast," (Page, (1980). The following account is adapted from Page,(1980), with additional information from P. Lucas of Hari Hari.

Plate 5. Cheese factory - nearing completion 1907.
(Photo, P.C. Lucas)

Plate 6. Haybarn - built from local timber.
(Photo, P.C. Lucas)

The sawmilling era in the Hari Hari district began with pit sawing in the early 1870's. Timber was initially required by the farming settlers for building houses, sheds and bridges. (Plate 6).

The first sawmill was established in 1905. This was a portable steam powered mill, which employed seven people, and cut timber for six weeks. (Plate 7).

Between 1905 and 1952 there were twenty-eight small portable mills. Some of these mills changed owners several times, and were shifted around the district according to availability of accessible stands.

Many of these mills operated for short periods and most were closed by the 1950's with the exception of Hari Hari Box Company, Mt. One One, Martini and Sarre, and Houston Timbers.

3.3.1 Timber

The early sawmillers concentrated on the dense kahikatea, matai and totara forests of the Hari Hari flats, leaving the present State Forests virtually untouched. Much of these forests were merely clear felled, and burnt by the early farmers, and the remainder was logged for timber.

By the 1940's most of the major totara stands had been logged; consequently, production of totara virtually ceased.

3.3.2 Processing

Very little timber was processed locally, most was sold "green off the saw". The first of two planing machines was installed in 1920, and the second between 1922 and 1928. The first and only kiln during this period was installed in 1934 by Hari Hari Box Company.

3.3.3 Employment

Most of the early mills employed between two and five people. The Hari Hari Box Company established in 1929 was the largest mill and employed ten people.

Employment was not continuous, as many mills operated for short periods of one to five years before closing or being sold. It is estimated that employment between 1905 to 1920 would not have exceeded twenty. Between 1920-1930 there were fewer mills, and from 1930-1950 no more than thirty-five people were employed at any one time. (Lucas, pers.comm.).

3.3.4 Production

In the 1880's and early 1890's sawmilling in Westland was a minor industry, producing about 3% of the country's timber supply, (McCaskill, 1960). By 1950 Westland's contribution to New Zealand's timber supply was 17%, and in 1977 Westland's contribution rose to 39%, N.Z.F.S., (1978).

3.3.5 Depletion of the Forests in Hari Hari District

The dense totara/matai and Kahikatea forests of the Hari Hari flats have been totally depleted save for a few remaining patches of bush and single trees standing alone in paddocks.

Logging of the State Forests, Ianthe, Wanganui and Saltwater did not begin until the early 1960s. Since this time a total of 11,500 ha have been logged, or 49% of the total area, (Table 1).

3.3.6 Administration

The early sawmillers were required to pay for timber according to the value of sawn timber, rather than on the volume of standing trees. This meant that the Crown earned a royalty, on not much more than a quarter of the available timber, because about 30% of the tree was lost in sawdust and wood chips.

This system lead to a great deal of wastage, as the sawmillers chose only the best trees, and were not concerned to obtain maximum conversion rates, (McCaskill, (1960).

The sawmillers left behind a devastated landscape. In these days it was thought that the timber resource was limitless.

TABLE 1 TOTAL AREA OF STATE FORESTS AND AREAS LOGGED

State forest	Total Area (ha)	Area Logged (ha)	%
Ianthe	10,912	6,700	61
Wanganui	4,717	3,500	74
Saltwater	7,614	1,300	17
Totals	23,243	11,500	-

Source: A.Reid, (N.Z.Forest Service, pers. comm.)

McCaskill (1960, p.75) wrote -

> "The popular impression of almost limitless resource has persisted longer on the West Coast than elsewhere because forest of some kind or other forms the backdrop of almost every view..."

This period was aptly described by Kennedy (1954, p.14) as the time during which; -

> "...the bulk of the districts wealth was won by some form of robber economy; that is by "mining" the natural resources and thereafter abandoning the land."

The Forest Service was formed in 1919 and took over administration of the state's forest resources.

A system of block sale selling was introduced. Sawmillers were required to pay for timber based on an estimate of the timber volume contained in measured stands.

This aimed to reduce the wasteful cutting practices of earlier years and conserve resources.

By the 1920's a number of people became concerned at the rate of forest depletion, and realised that if the forest industry was to be sustained in the long term, the forests must be managed for continuous yield, Ellis, (1920).

Despite these early ideas, the goal of management for sustained yield, was not implemented until the 1960's,

(refer to Section 4.2.3). In the meantime, the sawmillers continued to clear fell the best stands of bush.

3.3.7 1960's - 1980's

A change in the sawmilling industry occurred in the early 1960's, following the 1959 West Coast Committee of Inquiry into Forestry. The Forest Service adopted the Committee's recommendations and introduced a system of long term sales licences. These allowed sawmillers to cut a regular volume of timber over a period of about twenty years,providing the sawmillers installed 'improved' sawmilling equipment,and processed 80% of their cut on the West Coast.

As a result of this policy, three of the remaining small mills, who could not afford to establish processing facilities, Martini and Sarre, Mount One One, and Hari Hari Box Company, were bought by an Auckland firm, Henderson and Pollard between 1964-68.

Between 1968 and August 1980 there were two sawmills in Hari Hari; Houston Timbers and Henderson and Pollard. In August, 1980, Henderson and Pollard purchased the assets of Houston Timbers and closed the mill.

These two mills together employed approximately forty people for most of this period.

The West Coast Committee of Inquiry also recommended that cut over land, wherever suitable, be replanted in exotics.

However, the Forest Service generally regard exotic plantations in South Westland as undesirable for economic reasons, and consider that areas further north are more suitable. As a result, there have been only small exotic trials established.

The indigenous timber industry is an extractive industry, returning nothing to the forests. Although the practice of fertilising agricultural land was adopted early in the history of farming, forest management has not in the past included such practices.

The extremely slow growing nature of our forests means that they are essentially a finite resource, renewable only in the very long term. Consequently the lack of replanting, to speed up replacement of the original forests, means that forestry in South Westland must inevitably decline.

The commitment to long term sales severely constrains options for future forest management. It is now realised that these commitments can not be met by sustained yield from presently available forests.

Consequently, the honouring of the long term sale licenses will endanger the future supply, for local industries.

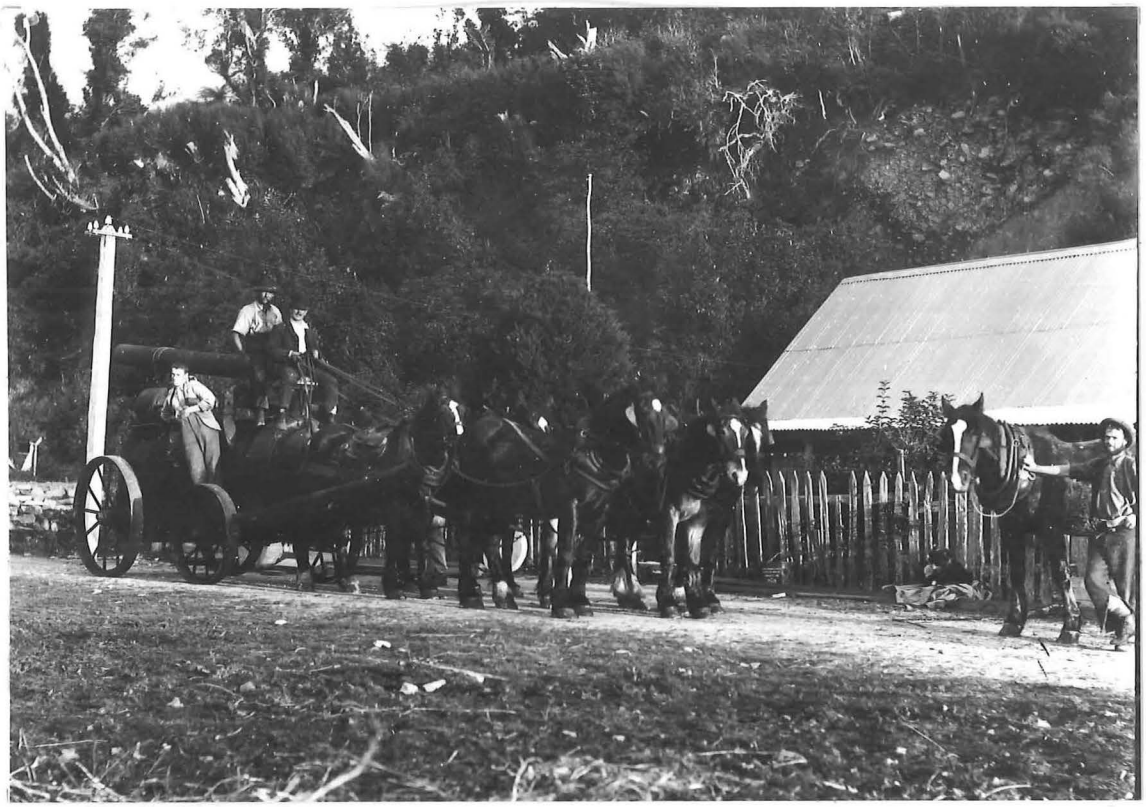


Plate 7. The first sawmill arriving in Hari Hari.
(Photo, P.C. Lucas)

Plate 8. Log sawing, Henderson and Pollard sawmill.
(Photo, Sue Maturin)

It was originally believed that the larger sawmills would promote efficiency, and reduce the amount of wastage. However it now appears that the smaller mills were more efficient, and less wasteful than the large mills.

Whereas the early small mills lost 30% of wood volume in sawdust, slabs etc., the present mills lose between 45-55% of the total wood volume. The small mills required skilled operators, and each log was cut according to its merits. The large sawmills employ mechanical techniques, which do not enable the precision in sawing achieved by the small mills, (Plate 8).

As the large mills are owned by companies outside the West Coast, they contribute little more than wages to the local economies.

With the benefit of hindsight, one realises the adoption of long term sale licenses was a serious mistake. The full implications of these will be discussed in detail in chapter seven.

3.4 NATURE CONSERVATION

In the early days of settlement little thought was given to the need to preserve areas. Areas that were preserved were generally those with no economic value. Kensington, (1907) in his report to the Minister of Lands, summed up the attitude towards nature preservation as follows;

> "It is only when the needs of the settlement have been amply met and provided for that comparatively small portions of land specially attractive in scenic appearance and usually somewhat poorer in quality or rugged in character are set aside as an endeavour to preserve the native fauna and flora in that locality."

One of the first scenic reserves in the Hari Hari district was Saltwater lagoon, reserved in 1928. Other scenic reserves followed in the 1930's and late 1950's.

It was not until the late 1960's, following the Manapouri controversy, that other values of forests began to be considered. During this controversy it became apparent that the public of New Zealand were becoming aware, and concerned of the despoliation of the natural environment.

In 1970, referring to the Manapouri debate, Chavasse wrote;

> "Foresters would do well to heed the public mood." (p.6)

Following this period the public began to demand that representative examples of forest ecosystems should be protected in National Parks and Reserves.

In 1977, the need to reserve representative examples of forest ecosystems was recognised in the Indigenous Forest policy. The success of this section of the policy is reviewed in Section 4.5.6.

3.5 THE TOWNSHIP

In the late 1870's the pack track from Ross had been extended along the foothills to Okarito. Now that travel was no longer confined to the dangerous route along the sea coast, settlement began in earnest.

In 1878 the first school was opened. The same building also housed the first church, boarding house ,and telegraph office. At this time there were only four families living in Hari Hari. These were farmers. It was not until the 1900's that the population, mainly farmers, and a few local sawmillers, began to grow.

With the growth of population came new services, and business, two more post offices were built, a new school, two stores, and of greatest significance, the dairy factory was established, (Table 2).

By the late 1920's many new farms were settled, and sawmilling began to increase.

Hari Hari remained relatively small until the 1950's when Government functions increased. Population increased from 423 in 1945 to 693 in 1976.

Table 3 indicates the number of openings and closures of businesses and services since 1950.

Hari Hari is one of the few West Coast communities which has continually grown. The majority of other small communities, which were based on the extractive

TABLE 2 BUSINESSES AND SERVICES

OPENINGS & CLOSURES

1878-1950

Education	Opened	Closed
Hende's School	1878	1890's
Settlers School	1899	1909
State School	1909	1924
Herepo School	1912	1924
Hari Hari School	1924	Became S.W.Area School
Post Offices		
Hende's Post Office	1878	1921
Hari Hari Post Office	1912	Still operating new building
Herepo Post Office	1914	1930
Church	1878	Two church's today
Boarding house	1878	
Public hall	1909	1930 present hall built
First store	1900	replaced - tea rooms
Second store	1908	replaced - general store
Hotel	1914	replaced
Cheese factory	1908	1920
(butter and cheese)	1924	1950's
Sale Yards		
Geoffrey & Co.	1920	early 1960 (Plate 2.5)
Houstons	1923	late 1950
Dalgety and Co.	1923	1939
Two butchers		1963
N.Z. Road Services	1935	1971
Garage	1946	new building

TABLE 3 SERVICES AND BUSINESSES

OPENINGS AND CLOSURES

SINCE 1950

Activity	Opened	Closed
1. Two butchers		1963
2. Ministry of Works	1950's	-
3. N.Z. Forest Service	late 1950's	-
4. Electrician	1950's	1979
5. Westland Power Board	1964	-
6. Hari Hari Post Office	Rebuilt 1966	-
7. Primary school became Westland Area School	1968	-
8. Hari Hari Construction	1969	-
9. Dominion Breweries took over the hotel	1971	-
10.T.A.B.	1972	
11.Eeel factory	1974	1975
12.Trans. West	1975	-
13.South Westland Savings Bank	1977	-
14.Arnold Transport	1978	-

Source: Personal interviews.

industries of gold and coal have experienced many fluctuations.

Hari Hari is dependent on farming and the extractive timber industry. The stability of Hari Hari in the past has been because large scale timber extraction did not begin until the 1960's. As with all industries based on the extraction of natural resources in a non sustainable manner, they must sooner or later decline, either rapidly,or lingeringly.

Within the next ten years Hari Hari is likely to experience the decline, if not the end of the timber industry.

3.6 SUMMARY AND CONCLUSIONS

The chapter began with a quote which said that the way in which a society uses its land determines its future.

The history of farming showed that;

a. The early farmers were concerned to clear extensive areas of land rather than farm intensively the areas already cleared;
b. Early practices of clearing and burning lead to a rapid deterioration of pasture quality. Today the farm landscape is comprised of scattered remnant stands of matai/totara and kahikatea, patches of blackberry and rushes and areas of sown and native grasses, (Plate 10);

Plate 9. Early Stock Sale, Hari Hari. (Photo, P.C. Lucas)

Plate 10. Poor quality pasture. (Photo, Sue Maturin)

c. Although these early practices reduced the natural productivity of the land, they did not deplete the land's resources. This was partly due to the fact that farms were large, and consequently farmers had no need to farm their land intensively. Today farming continues and future options for development remain open;

d. Farming formed the basis of a steadily growing community.

On the other hand, the sawmilling industry continually fluctuated. The early mills were located adjacent to a good stand of bush, and once this was cut out the mill would either close, or be relocated elsewhere. The fact that the total number of mills at any one time remained relatively constant until the 1950's, was due to the large timber resource. The very nature of the sawmilling industry, (i.e. "cut and get out") spelled an inevitable depletion of the timber resource, and with it a decline in the sawmilling population.

This trend was recognised in the 1920's and it was realised that if the forest industry was to be sustained, the forests must be managed for continual yield. However, the early practices did not change until the 1960's, and the forests continued to be seriously depleted, bringing closer the inevitable decline in the timber industry.

In the 1960's the Forest Service adopted the policy of long term sale licences. These lead to the

replacement of the small mills by large, less efficient, sawmills.

These agreements for supply of a nominated timber volume were made, with the belief that the methods of logging (practiced then) would enable forests to be managed for sustained yield. This belief was based largely on theory rather than proven results, as shall be shown in the following chapter.

Today it is realised that these commitments can not be met, if the remaining forests are harvested for sustained yield.

The history of the township showed that farming is the basis of the community, and that the population increased with the introduction of Government Departments, which provided more diverse employment. This fact suggests that future increases in employment might be expected from the introduction of alternative employment activities, rather than an increase in the present activities.

In conclusion, the history of agricultural and forestry practices, indicates that agriculture, unlike forestry, did not seriously deplete the land's resources. Consequently, agriculture which is the basis of the Hari Hari community, continues and future options for agricultural development remain open. Conversely, the sawmilling industry is faced with a decline, and as a result of past practices and policies, options for the future are limited.

The history of land use and community trends shows very clearly, that the way in which Hari Hari has used its resources, has influenced its future.

Chapter Four

Present Land Use

4.0 INTRODUCTION

Land use planning is an evolutionary process involving survival of the most well adapted, and most effective land use practices.

Future options for land use must build on those practices which are the most well adapted, and discard those that are least well adapted.

Land use planning benefits from past knowledge and practical experience and draws upon current scientific knowledge.

Knowledge of the constraints imposed by natural systems on sustained and productive use of land resources is gained from an understanding of past successes and failures.

This chapter describes current land use practices and knowledge gained from practical experience with regard to agriculture, forestry, nature conservation, recreation and mining. Each land use is treated separately.

The purpose of this chapter is to identify the lessons learnt from past experience and to apply these to possibilities for the future.

4.1 AGRICULTURE

4.1.1 Sources of Data

Information concerning farm practices, production, expenditure and income, farming trends, and attitudes towards future farming practices, was obtained from Federated Farmers, and personal interviews with six dairy farmers and seven sheep and beef farmers, (Tables 4 and 5). The sample included farms of high and low productivity. Section 6.1 describes the method of interviewing.

4.1.2 Statistical Summary of Agriculture in Hari Hari.

The following statistical summary describes agriculture in Hari Hari. This statistical survey is presented in sufficient detail to permit readers, who have a good understanding of New Zealand agriculture, to make relevant comparisons with other farming districts. Themes that emerge from this review, that have significance for this study, are brought together in the summary at the end of the chapter.

TABLE 4 AGRICULTURAL POPULATION SAMPLE - AGE OF FARMERS

Age of farmers	Dry Stock	Dairy
Under 35	3	4
35-50	2	1
Over 50	2	1

TABLE 5 POPULATION SAMPLE - LENGTH OF TIME IN CONTROL OF FARM

Time	Dry Stock	Dairy
Under 2 years	1	3
2-10 years	1	1
Greater than 10 years	5	2

i. Land Cover

Farm land in Hari Hari occupies 13,398 hectares, which is 30% of the study area. This is composed of approximately 8,800 ha. of pasture, and 4,800 ha. of undeveloped land, which is dominated by native forests, scrub and swamp (Ministry of Works land inventory work sheets 1974).

Of the six dairy farmers interviewed, the average total unit is 137 ha., however of this, the average production unit is 92.8 ha.. A significant amount of land, 328 ha., has yet to be brought into full production. Of the seven sheep and beef farmers interviewed, the average total unit is 455 ha. with an average production area of 332 ha.. Some 1610 ha., remains to be brought into full production. The size of farms is a legacy of the past. Section 3.1 noted that the large sized farms provided little incentive to use the land intensively. This pattern still exists today.

Figures for the total area suggest that 3,913 ha. remain in native forest, scrub, and swamp dominated areas. These areas may be capable of development. (Plates 11 and 12).

ii. Farm Description

There are 32 dairy units and 22 sheep and beef units. The dairy units range from 80 ha. to 200 ha., with herd sizes from 74 to 166. The average herd is 116.

Plate 11. Early Stages of Land Development - 1980.
(Photo, Sue Maturin)

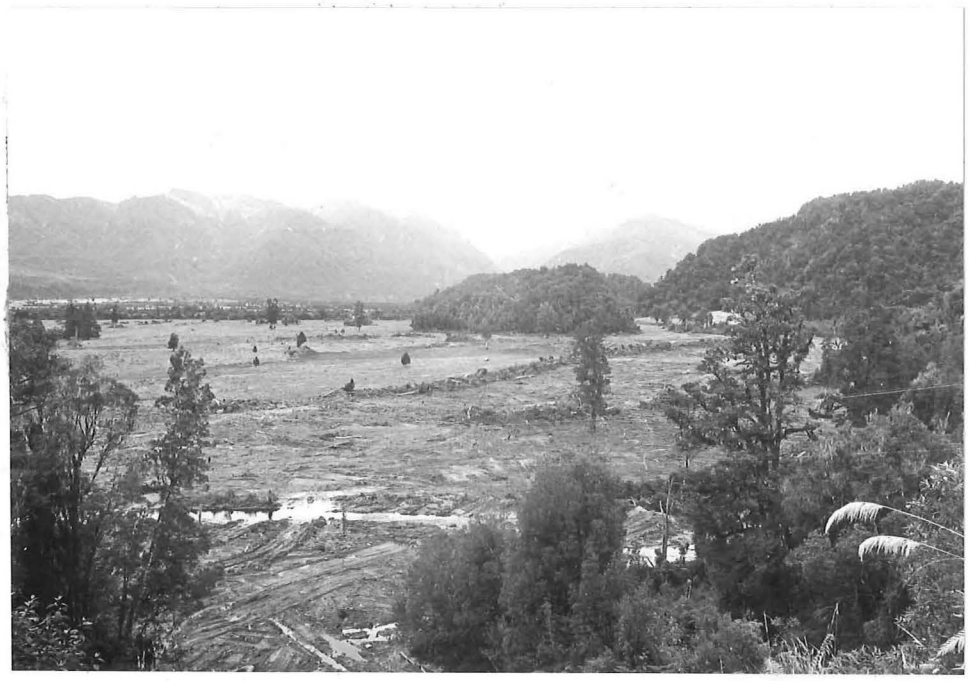


Plate 12. The bush felled and grass sown - 1980.
Photo, Sue Maturin)

Sheep and beef units range from 128-300 ha. Flocks of sheep range from 250 to 2,000 and beef cattle and calves, 125 to 500.

Dairy herds comprise Jersey, Fresian, and Jersey Fresian Cross. In 1977 there was a slight swing to Freisian herds, but this has since declined, (Plate 13). Dominant beef cattle, include Hereford, Black poll, and Hereford cross. Perendale sheep are the most popular, with Romney/Perendale cross and Border Leicester cross also common.

iii. Farm Productivity

It was found that high stock units per hectare (su/ha) is not necessarily indicative of a high producing farm. The dairy farm producing highest butterfat per cow has below average su/ha..

Farmers' experience in Hari Hari indicates that although their farms may be capable of carrying more su/ha., production does not necessarily increase correspondingly. An experienced farmer advises that the best results are achieved from well fed stock. Production is largely dependent on the level of pasture management, with those who, from experience, are best able to fit management patterns to the pattern of pasture growth. This suggests that appropriate feed budgeting, based on an understanding of pasture growth and knowledge of nutrition levels for different classes of stock, may be the best means of increasing stock performance.

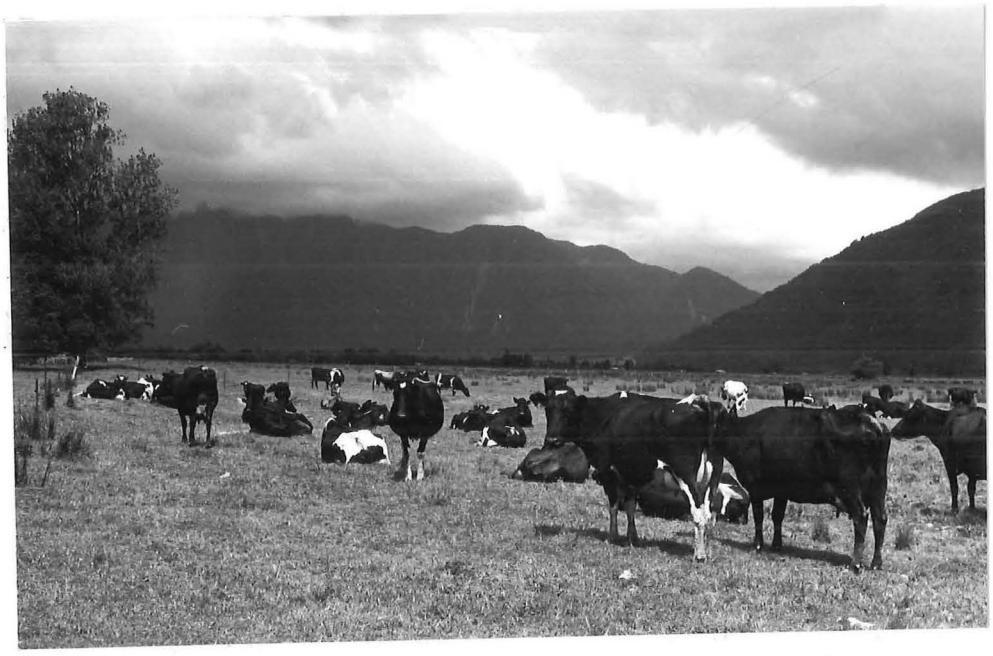


Plate 13. A Fresian Dairy Herd.

Similar results were obtained from a study of North Canterbury sheep and beef farms (McChesney, (1979). McChesney found that farmers were concentrating upon increasing stock performance rather than increasing stock numbers.

Stock units per hectare for dairy farms (on production areas, as at January 1980), range from 11 to 15, with an average of 13.5.

For sheep and beef farms stock units per hectare range from 7 to 15 with an average of 10.5.

Production per Animal: (total district)

Wool = 3.5 - 4.2 kg.

Beef = Ave. 130 kg.)
Mutton = Ave. 25 kg.) For Westland County. (Agriculture Statistics)

Butterfat = 74 kg. - 157 kg.

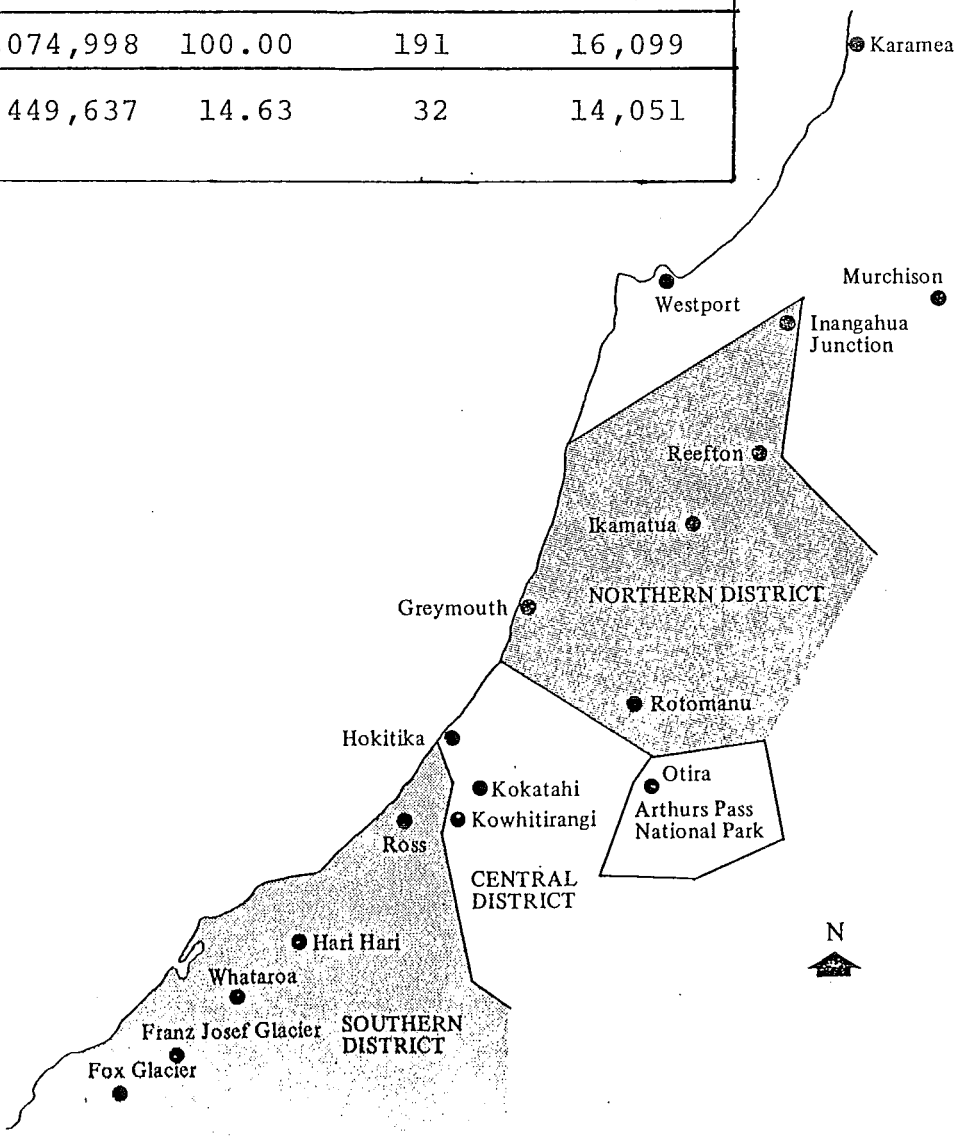
Hari Hari contributed 14.6% of the total amount of milk fat received at the Hokitika dairy factory, (1979), which is 50% of the milkfat supplied from the southern area, (Table 6).

The average milk fat per Hari Hari supplier is slightly below the average for the total supply area.

iv. Farm Expenditure and Income, 1979. (Interview sample)
Dairy farm expenses ranged from $15,000 to $30,000.

TABLE 6 MILKFAT RECEIVED WESTLAND DAIRY CO-OPERATIVE

Districts	Milk fat Received (kgms)	% to Total	Suppliers	Ave.milk fat per supplier (kgm)
1977 - 78				
Northern	995,248	30.58	64	15,551
Central	1283,370	39.44	69	18,600
Southern	975,507	29.98	60	16,258
Total	3,254,125	100.00	193	16,861
Hari Hari	534,747	16.43	33	16,710
1978 - 79				
Northern	999,168	34.49	63	15,860
Central	1,183,239	38.48	67	17,660
Southern	892,591	29.03	61	14,633
Total	3,074,998	100.00	191	16,099
Hari Hari	449,637	14.63	32	14,051



Sheep and beef farm expenses ranged from $14,000 to $26,000.

The highest costs are incurred for lime, seed and fertilisers. These costs account for between 50-60% of operating costs. Fuel, oil, vehicle and tractor expenses, repairs and maintenance and freight cartage also rank highly.

Dairy farm net income ranged from $1,000 to $40,000 and sheep and beef from $5,000 to $56,000.

Those with the highest income are not necessarily those with the largest farms or highest stock numbers, but rather those who manage their farms more efficiently.

v. Standard of Living.

Standard of living was assessed according to material possessions.

Many farmers are building new homes or improving existing homes. New cars are a common sight on the roads. The Hari Hari farming district appears relatively prosperous compared to other West Coast areas, especially further south. The affluence is a recent event, as ten years ago farmers were more concerned to develop their farms.

vi. Age of Farmers (total district)

The majority of farmers are between 30-45 years of age. There are very few farmers over 55, and those who are,

have sons working on the farm. Young farmers are more willing to take risks and borrow heavily to increase farm development.

vii. Turnover rate of farms (Total district)

Turnover rate of farms is the number of times the farm in question has been purchased and sold.

	Once in last 14 yrs.	2 x in 14 yrs.	3 x in 14 yrs.
Dairy farms	3	2	4
Sheep and beef	1		

Today the easiest means of obtaining farm land is to buy a dairy unit. Some farmers buy dairy farms with the intent of making enough money to buy a sheep and beef unit, usually in the North Island or Canterbury. Recently four North Island farmers have bought dairy units in the district. Only one of these intends to stay in Hari Hari (Muir, pers.comm).

The majority of dairy farmers do not intend to continue dairy farming for the rest of their lives, and will either move out of the district or where possible, convert their units to sheep and beef units. There has been one farm amalgamation and one farm subdivision in the last ten years.

viii. Labour employed on Farms.(Total district)

Only one farmer employed a full time single hand. On most farms, family members provide much of the labour input.

At harvesting times farmers help one another. The farmers interviewed cited the following reasons for not employing extra labour:-

a. cannot afford extra labour;
b. not enough work to justify extra labour;
c. do not require extra labour; and,
d. good labour is difficult to find in Hari Hari.

Most farmers said they have no need for extra labour. A few indicated that should production increase, some casual labour might be required.

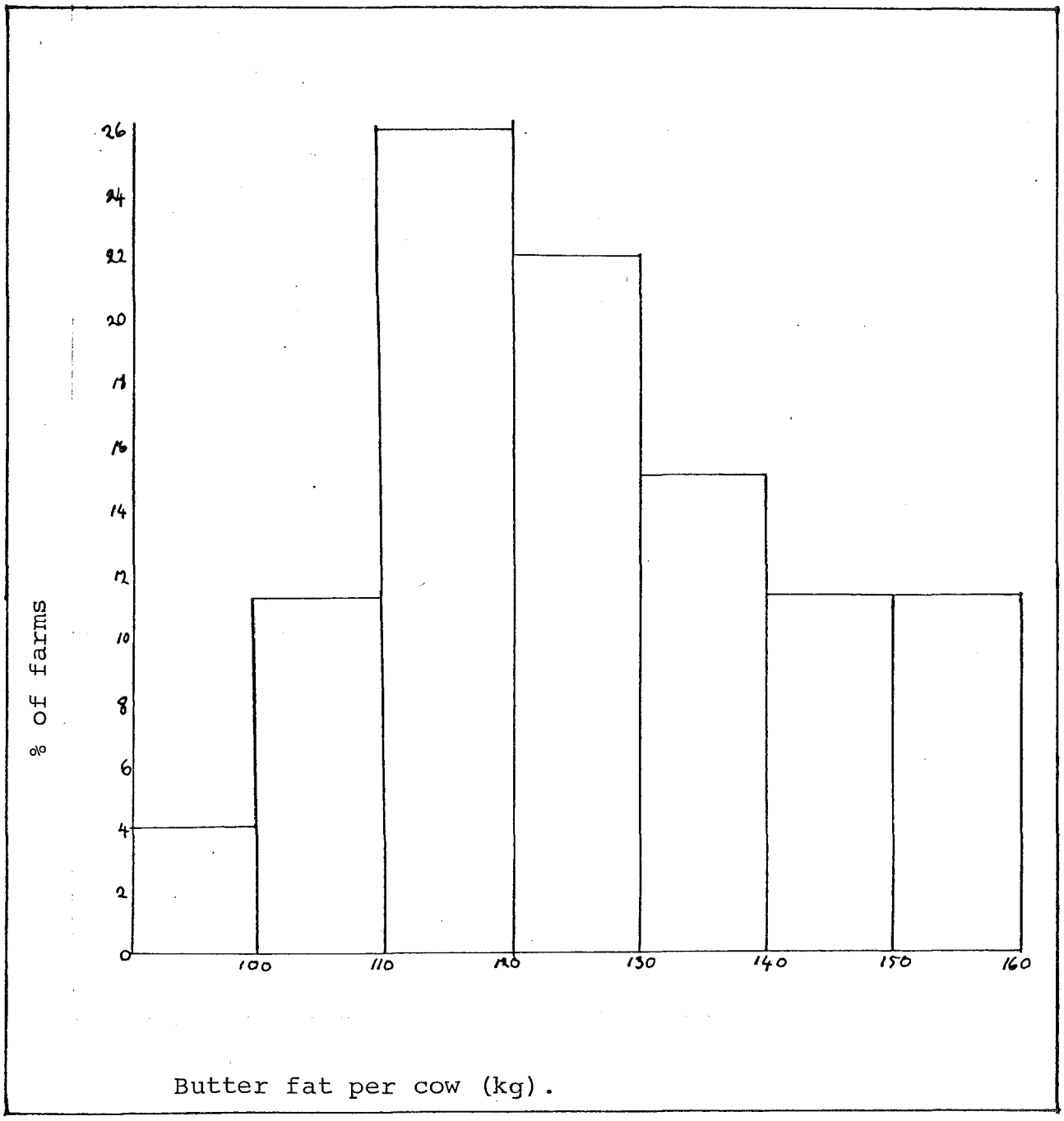
4.1.3 Scope for Increased Production on Farms

Twenty-seven percent of the total area, considered suitable for farming, remains to be brought into full production, (Ministry of Works land inventory work sheets 1974).

Knowledge concerning the suitability of this land for development and production potential is incomplete, due to lack of understanding of soil patterns, (discussed in Appendix B) and feasibility of pakihi development, discussed in Section 7.1.2.

Farm production may also be increased by improving farm management efficiency. Figure 6 indicates that there is a large proportion of farms producing between 110-115 kg. butterfat per cow, and a small proportion of farms producing over 150 kg butterfat per cow. Conceivably, the majority of low producing farms could substantially increase production.

Figure 7. Range of Dairy production of Hari Hari farms - Butter fat per cow.



Source: Westland Co-operative Dairy Company.

As stated above, the best means for achieving greater production, may be through an increased understanding and application of knowledge of pasture growth and nutrition levels for stock.

I am wary of predicting future agricultural production in Hari Hari, based on average potential su/ha for respective soils, as can be done, using the Ministry of Works Land Resource Inventory Work Sheets. I believe that information concerning the relationships between climate, soil and grass growth and relationships between soil characteristics and pasture responses to fertilisers and grazing regimes, is insufficient.

In order to adequately assess potential productivity, there is a need for a more detailed understanding of these relationships. Furthermore, the existing information concerning soil patterns is scarce (Appendix B).

4.1.4 Reasons for not Increasing Production.

(Interview sample)

i. Lack of capital:- Although farm development loans are available, most farmers are not eligible, as they can only afford to develop less than the minimum amount required for the granting of a loan. Others do not wish to increase their financial debt. Only three land development encouragement loans, (totalling 646 ha), have been applied for and granted to Hari Hari farmers.

ii. Farmers' attitudes:- Most farmers are earning a comfortable living from their present farms and have little incentive to increase production, or to develop more land. The existing size of farms does not provide incentive to develop land. In the future, thought should be given to rationalising farm boundaries.

iii. Lack of River Control and Flood Protection
Farmers believe that insufficient flood protection and river control work has been carried out by the Westland Catchment Board.

The Catchment Board in turn is constrained by lack of finance and can only afford to carry out piece-meal protection works. Government allocation in 1980 was $834,000. In addition, individual farmers contribute for works that benefit them. Between 1967 - 1979 the Hari Hari district contributed $202,611. Despite the large amounts of money, the amount of river protection work is inadequate. Ideally, both the Wanganui, Poerua rivers and La Fontaine Stream require an entire scheme. (Clark, pers. comm.)

Farmers have found the process of obtaining approval for flood protection-work slow, and often land has been lost while waiting for work to be done.

4.1.5 Other Farming Types

i. Deer Farming

Deer farming is relatively new to Hari Hari with four farmers experimenting. One farmer has deer fenced 6 ha. and is running 21 hinds and 9 stags,(10 su/ha.). He believes that it would be possible to run 17 su/ha.. Thus if deer farming proves viable in Hari Hari, it could be the most productive use of the land, depending on production per animal. The venison will probably be sold in Hokitika.

There is a high interest in deer farming in Hari Hari. The conditions appear to be suitable and wild stock free of T.B. close at hand. However, capital is a major obstacle. Fencing alone costs $2,500/ha..

ii. Opossum Farming

At present one person is experimenting with opossum farming with the hope that it will eventually be a full time job. Sixty-three opossums are housed in the old dairy factory. Capital outlay for this venture is minimal when compared to other farming systems.

Feed consists of docks, willow branches, barley meal and pollard. Feed costs approximately 25c.per animal per week. Stock are kept for 14 months before being killed for their fur. Total feeding costs for an animal for fourteen months is approximately $10.65.

Viability of the venture depends upon keeping feed costs at a minimum, production of top quality fur and high market prices.

The farmer plans to increase the number of opossums to 1,600 which would require an extra part-time labourer. With 1,600 opossums it is estimated that 40 ha of crops, either a root crop, or willows, will be needed to make the farm viable.

Whilst housing and hand feeding opossums is expensive, free ranging may be a more viable means of farming. Studies have shown that five opossums eat as much as one sheep, therefore it is possible to run five opossums on the same area as one sheep. The return from opossums would be much greater over eighteen months than one sheep, although the initial outlay would be more expensive (Gray, pers.comm).

The farmers in the district have shown little interest in the venture, believing that while wild opossums are available, farming opossums can not be viable. However, the present opossum farmer believes that wild opossums are becoming increasingly difficult to trap and hunters are now having to concentrate in remote areas. In trapping opossums in the wild, all ages are caught and those between 8-10 years old do not have high quality skins. Farming opossums allows the production of top quality skins, therefore the average return on skins will be much higher than is possible for wild opossums.

Despite the pessimism expressed by the district, the present farmer remains optimistic, that in the long term opossum farming will become a viable and productive system of farming.

iii. Bee Keeping

There has been one part-time apiarist in Hari Hari since 1936. The maximum number of hives kept at any one time was 210 which produced a maximum of 14.22 tonnes in a season. Most of this honey was sold locally.

Today there are 600 hives between Whataroa and Hokitika owned by one full-time apiarist. Production this year (1980) was 12.19 tonnes. This year has been a poor season for honey production on the West Coast.

Main sources of nectar are:

Rata (a good crop occurs once every three years)
White and red rata vine
Lichen
Native Fuschia
Wine berry
Kamahi
Marble leaf
Native flax
Willow
Blackberry

Climate is the biggest problem, long periods of wet weather during the summer season lowers production, although it is very rare to have a complete failure. Temperature affects the honey flows. Ideal weather is coolish nights and continuous hot days. The wet climate of the Coast causes gear to deteriorate rapidly and gear in Canterbury lasts three times as long as on the Coast.

It is estimated that Hari Hari could support between 800 - 1000 hives, enough to support one full-time apiarist(Lucas,(pers.comm).

iv. Farm Forestry

A number of farmers expressed interest in farm forestry and would consider planting exotics if encouragement loans were available. Farm forestry encouragement loans are unavilable for areas south of the Waitaha Bridge.

4.1.6 The need for Research

> "It is abundantly clear that management must build upon sound knowledge of the physical and climatic environment if effort and resources are not to be wasted."
>
> (Molloy et.al. 1980, p.128)

This comment by Molloy et.al., (1980) applies to Hari Hari. A certain amount of knowledge regarding live-stock performance and pasture management has been

gained from experience. But progress is hampered by inadequate information concerning the physical and climatic environment.

Important areas for research include:

a. Soil characteristics, depth, texture, pH levels, moisture regimes, trace element deficiencies and natural fertility:
b. relationships between soil characteristics, grass growth and climate;
c. pasture response to fertilisers and grazing practices;
d. possible means for minimising fertiliser requirements;
e. seasonal nutrition requirements for different classes of stock; and,
f. evaluation of the right mixture of plants for the Hari Hari (and other West Coast) areas. In some places pastures are required to withstand drought whilst in other places waterlogged conditions must be tolerated.

This list is not exhaustive, nor might all the suggestions be considered valid. However, neither time or knowledge allows me to discuss the need for research in greater detail.

4.2 INDIGENOUS PRODUCTION FORESTRY

4.2.1 Introduction

The history and assessment of logging systems in South Westland has been well documented by James, (1980).

This section will briefly review the history of rimu silviculture, the results of management systems, recent research findings, and current proposals for a logging method. The impacts of logging upon the forest ecosystem will be assessed to determine where more knowledge is required. Suggestions will be made for future research.

4.2.2 History of Rimu Silviculture

There are two major schools of thought concerning the structure and replacement trends of terrace rimu forests, Foweraker and Hutchinson, and Chavasse and Travers.

i. Foweraker and Hutchinson, (1935).

Foweraker and Hutchinson concluded that terrace rimu forests formed groups of even-aged stands resulting from "blow downs". Based on this interpretation, they proposed that stands of mature and semi-mature rimu should be clearfelled and left to regenerate.
A rotation length of 220 years was suggested, (in James, 1980). These suggestions were not implemented.

ii. Chavasse and Travers, (1966).

Chavasse and Travers concluded that the natural stand structure of terrace rimu forest was uneven-aged. They recommended a conversion period of 120 years, with 4,5,or 6 felling cycles, to remove excess larger trees and allow an increase in the number of smaller trees. Volume yield per annum was estimated as 1% of the growing stock volume, which approaches the natural increment determined for ideal stands. These recommendations form the basis for the current system of selection management.

4.2.3 History of Management Systems

i. Terrace Rimu

Selection logging of terrace rimu forests, based on Chavasse and Travers proposals, began in Ianthe State Forest in 1963. Since this time a number of logging systems have been introduced to all the state forests in the study area. Today logging takes place in Ianthe, Wanganui and Saltwater State Forests. These forests cover 23243ha.,which is 56% of the land in the study area.

The history of terrace rimu logging trials has been fraught with difficulties, which are summarised below:-

Management System	Results
Radial hauling - (cable logging).	- Net loss of residual volume
Parallel hauling - (cable logging).	- Minimal damage to residual trees
	- High windthrow rates

Crawler tractor logging;	- Ponding and tree damage caused a net loss of residual volume
	- Windthrow was minimal
Diagonal hauling (cable logging);	- High mortality due to windthrow and physical damage to trees but stand showed a small net increment
Rubber tyred Skidders;	- Extensive stand disturbance and damage due to windthrow, ponding and barking
	- Mortality exceeded natural increment by 40%
Branched radial hauling (cable logging, Plate 14).	- Results have not been assessed

James, (1980, p.ii) in reviewing the management systems arising from Chavasse's and Travers' theories concludes that;

> "Problems encountered with selection management over the past 17 years have arisen mainly because the selection silvicultural system is unsuited to the biology of terrace rimu forest; that is because it is semi-even aged in its natural state and also highly susceptible to windthrow and physical disturbance."

ii. Hill Country Logging

Hill country forests have lower stand volumes than the terrace rimu forests, and logging methods differ. (Plate 15).

Two types of logging, diameter limit cutting and partial logging have been tried. Diameter limit cutting involves removal of 50% of the merchantable volume. Partial felling removes total merchantable volume, leaving 15 seed trees behind.

Plate 14. Landing of a Branched Radial haul Site - 1980.
(Photo, Sue Maturin)

Plate 15. Hill country Logging - partial felling.
(Photo, Sue Maturin)

Results of these trials indicate that windthrow resulted in significant losses of trees following logging, James, (1980).

4.2.4 Recent Research Findings

The unsatisfactory results of the logging trials have prompted more research into the problems of windthrow and forest structure and the process of replacement.

i. Windthrow

James, (1978), concluded that trees in virgin forests relied upon crown interdependence for their stability in high winds as much as root strength. Consequently, once the canopy was opened up windthrow resulted.

Recent research supports Hutchinson's (1932) idea that windthrow is a natural phenomenon. James, (1980), noted that tree stability is dependent upon a compact root plate in waterlogged soils with restricted lateral and vertical drainage, rather than crown interdependence as previously thought. James also recognised that gales play an important role in natural windthrow. Particularly gales from the north, south-west and south-east, although individual areas are not normally susceptible to all three directions. Current knowledge of natural mortality is limited to two stand types.

James concludes;

> "Until much more is known of the natural processes in terrace and hill rimu forests it is only possible to draw broad generalisations about the changing mortality rates and the influence of logging."
>
> (James, 1980, p.12)

4.2.5 Forest Structure and Replacement

Recent research by James (1980) supports Foweraker and Hutchinson's theory, that the terrace rimu forests are composed of a mosaic of even-aged stands, which undergo a continuous cycle of replacement. It is thought that the natural cycle takes 500 years to complete. However, evidence is scant.

James suggests that the growth of young seedlings is limited by soil factors and not light, as Chavasse and Travers (1966) originally thought. The key factor in soils appears to be their low nutrient status. It is thought that nutrient status is built up during a phase of hardwood dominance, and which enables the establishment and growth of rimu poles, which eventually gain dominance.

These findings, which, are no more than observations and require verification, led James to conclude;

> ".....that an even-aged silvicultural system would be more appropriate for the majority of terrace rimu stands."
>
> (Ibid, p.18)

4.2.6 Current Logging Proposals

Based on James's (1980) findings, it is proposed that a continuous yield be obtained from small scale (2-10 ha)

clear fellings of mature and old growth stands. In the old growth stands the objective should be to remove all old growth. In the mature stands where regeneration is believed to be more scarce, the stand will be clearfelled and planted with nursery raised seedlings.

To minimise wind-fall problems, it is recommended that the clearfelled areas should be rectangular strips and aligned orthogonal to predominant gale-forced winds.

It is probable that the low ground pressure tractor (Plate 16) or tracked skidders will be used to provide flexibility for special areas and to cope with salvage problems.

Cable logging (Plate 17) will be best suited to clear-felling the mature stands.

In theory this system should influence on average one quarter of the forest area so that induced mortality will only occur around the felling edges. With the present selection system, the first felling cycle affects the whole forest (James, 1980).

4.2.7 Present Assessment of Logging Impacts upon the Forest Ecosystem

The forest ecosystem consists of communities of plants, animals and micro-organisms, along with the air, water and soil.

Plate 16. Ground Pressure tractor. (Photo,Sue Maturin)

Plate 17. Cable logging. (Photo, Sue Maturin)

The assessment of logging impacts upon the ecosystem has been confined to the impact upon residual stand structure and health.

It is known that rimu grows extremely slowly, with net increments ranging from 1 - 3.6 m^3/ha/annum, and that if the amount extracted by logging exceeds annual increment, the forests will eventually be depleted, (James, 1980).

It is esimated that sustained yield from the virgin state forests in the study area is 3,200 m^3/annum. In 1979 a total of 60,800 m^3 was cut from these forests, (Griffiths, pers.comm). This is approximately 57,600 m^3/annum above estimated sustained yield.

It is known that further timber volume is lost from the forests following logging, due to windthrow, ponding, and physical damage, (Plates 18 and 19).

Consequently we know that the current cutting rates and logging methods are severely damaging the forest structure, and are steadily reducing possible options for the development and future sustained yield management.

Quite clearly, this continual damage to the forest structure has implications for other components of the forest ecosystem. Knowledge of ecological principles indicates that;

Plate 18. Ponding along a haul lane.
(Photo, Sue Maturin)

> "A change in any one part of an ecosystem almost always influences the numbers and health of organisms and rates of processes elsewhere in the ecosystem."
>
> (Molloy et.al., 1980, p.8)

Before the effects of logging upon the forest ecosystem can be determined, further research is needed.

4.2.8 The need for more Research

One of the goals of forest management is;

> "To ensure that no action is taken within the forest whose future effect has not been estimated and accounted for as well as it can be, and to maintain options for future generations where it is practicable to do so."
>
> (N.Z.Forest Service, 1980, p.50)

This goal requires further study of the forest ecosystem and the natural processes operating within. The above review of existing knowledge of the forest ecosystem and the affects of logging highlights the following areas where more knowledge is needed:

a. Forest structure and replacement patterns;
b. natural processes of mortality;
c. soil patterns and influence upon forest structure;
d. mechanisms of natural regeneration;
e. climatic influence upon forest structure and natural processes;
f. the role of forest birds in podocarp regeneration;
g. habitat requirements for wild life;
h. the influence of logging upon forest succession, and species diversity;
i. the long term impact of logging upon soil productivity; and,
j. the impact of logging upon forest bird species diversity and density.

Plate 19. Damaged rimu - roading casualty.
This tree will eventually die.
(Photo, Sue Maturin)

Before any alternative system of logging is adopted, the above aspects of the forest ecosystem (a-g) must be understood and the likely impacts resulting from logging (h-j) must be estimated.

An understanding of soil and landscape patterns, along with their relationships with vegetation and associated fauna provides a starting point for an understanding of forest ecosystems. Soils play a dominant role in the condition and nature of the land ecosystem, (Cutler, 1977).

Currently, the South Island General Soil Survey map and interpretations is the only soil data available. The Ministry of Works Land Resource Inventory Work Sheets also include soil information, but this is based on the soil survey maps, (Appendix C). This soil survey maps the dominant Soils of the South Island at a scale of 1:253,440. At this scale it is only possible to provide basic information for predicting future land use capabilities. Furthermore, the accuracy of the soil definitions has recently been questioned. Appendix B discusses the shortcomings of the soil survey in detail.

To provide reliable soil information, a soil survey is required. A soil survey may take the form of:

1. a regional reconnaisance, at a scale of 1:50,000;

or 2. a very detailed survey of sample areas at 1:2,000 or 1:5000 to investigate the value of a detailed soil survey, to determine a suitable scale, and to establish the kinds of measurements and interpretations which might be useful.

As there is little knowledge of the soil patterns, their influences upon vegetation patterns and their performance under different management practices, it would be difficult to determine the kinds of measurements and interpretations which might be useful. Accordingly, it would be more appropriate to conduct detailed soil survey samples. Some interpretations which might be useful include;

i. the potential of each soil for producing forest trees, and their characteristics and qualities that affect management. This could include assessment of;
   - plant competition
   - equipment limitations
   - seedling mortality
   - windthrow
   - erosion hazards

ii. The performance of soils according to;
   - growth rates of forest trees including exotic species
   - type and use of machinery
   - regeneration

iii. Chemical and physical properties of soils relating to;
- suitability for replanting exotic and indigenous species
- nutrient deficiencies and fertiliser requirements

iv. Soil interpretations for roading to;
- locate and design access roads
- estimate runoff, determine erosion hazards
- locate sources of sand, gravel or fill material for construction purposes
- determine load bearing capacity of soils

v. Suitability of soils for agriculture/horticulture (refer to Section 4.1.6)

vi. Soil interpretations for wildlife;
- inter-relationships between soils, vegetation and wildlife

vii. Soil interpretations for recreation to aid in the location of roads, tracks, picnic areas and physical structures;
- hydrological and engineering characteristics
- liability to erosion or damage

This list of facts that are not known and should be known, is considerably longer than the list of things that are known.

4.3 PROTECTION FORESTRY

Forests prevent both mass movement and surface erosion. They control transfer of water from atmosphere to streams and from soil back to the atmosphere. The value of Westland forests in maintaining soil and water values is extremely high, and only uses compatible with the protection function can be permitted.

In the study area, protection forests include the steep moranic slopes occurring in Ianthe, Wanganui, and Saltwater State Forests, and mountainous country east of the alpine fault.

4.4 EXOTIC FORESTRY

4.4.1 Results of Trials

Trials with exotic species, most commonly Pinus radiata, are presently being carried out in Ianthe State Forest on shallow strongly gleyed soils. (Table 8 lists trial species).

Best growth has been found on ridges, with shallow stonier, possibly drier sites, or those which have been planted on old stump mounds. Growth is generally patchy and poor. This could in part be attributed to the wet infertile soils, although other factors, the planting stock, planting technique and second growth competition must also be taken into account (Mew, 1979).

Results indicate that P. Muricata, P. radiata and A. melanoxylon, are the most suitable exotic species. However, it appears that the other species may be suitable if soil drainage and fertiliser applications are conducted.

Fertilisers have not been applied to the above trials. The best growth of Pinus radiata recorded 23 m at 20 years. It is believed fertiliser applications would increase growth to 26-27 m at 20 years (Buckman, pers.comm.) Analysis of soils on the trial sites had not been thorough, and there is need for further research to determine the best growing sites, the most effective quantity and type of fertiliser applications, etc. Results from the above trials do not give a real indication of site potential due to;

a. poor site preparation
b. lack of maintenance of stands
c. lack of fertilisers

TABLE 7 TRIAL EXOTIC SPECIES

Species	Area (ha)
P. radiata	92
P. contorta	100
P. nigra	2
P. muricata	1
Ps. menziesii	7
Pic. stitcheisis	4
Eucalyptus delegatensis	25

Also present; E. botryoides, E. saligna, E. nitens, E. regnans, poplar species, Cup. arizonica, C. japonica, A melanoylon and Thuja plicata.

Source: Buckman, (N.Z. Forest Service, pers.comm.)

Experience in other forests in New Zealand has shown that vigorous fast growing forests result when sound management practices include the use of fertilisers, physical amelioration of the soils and logging methods that minimise soil disturbance. These same basic principles apply to native forest management (Will and Neary, (1977).

4.4.2 Need for Research

Little is known of the possible influences the planting of exotic species will have on the terrace soils. Cutler (1977) notes that soil properties may be modified significantly by trees during their life, for instance, Northern conifers such as Scots Pine is known to induce podzolisation where soils are already strongly leached and acidic, but as yet there is no evidence that Pinus radiata will behave in this manner. Mor formation and podzolisation is more likely to occur where;

a. Rainfall is high and leaching is rapid leading to development of highly acid soil conditions.
b. Temperatures are low, thus slowing down the rate of mineralisation of litter.
c. Soils are already strongly leached or strongly weathered, or both and have low reserves of nutrients.
d. Parent materials have low reserves of nutrients.

Conditions 1, 3 and 4 occur in the terrace soils of South Westland. The provisional results of the current soil survey (Appendix B) indicate that Gleyed soils are more common than the podzolised soils, in the Hari

Hari district. As these soils are not yet podzolised there is a need to ensure that exotic species will not induce podzolisation. Before establishment of exotic species is recommended, research should be carried out in order to determine how exotic species will affect the soils.

Significant quantities of nutrients are moved from a site in logs, although these removals occur only once every 25-30 years in most exotic forests, and at much longer intervals in managed indigenous forests, (Adams, 1977). Clear felling and removal of logs from a beech forest probably removes about 170 kg/ha of nitrogen and 30 kg/ha of phosphorus. Although nutrient removals have not been assessed for podocarp forests, it is thought to be similar (Adams, 1977). Adams (1977) suggests that the conversion of a beech forest to radiata pine, after a hundred years will have removed approximately 10% and 8% of the total ecosystem nitrogen and phosphorus on typical West Coast hill country.

The significance of such losses depends upon the nature of the ecosystem being considered. Maximum impact occurs in low nutrient ecosystems, typically associated with strongly weathered and leached soils. One would expect that in these ecosystems, that nutrient removals resulting from forest management will lead to reduced productivity in future rotations unless these nutrients are replaced by fertiliser additions (Adams, 1977).

Dugdale and McColl (1977),in a study of fauna of podocarp and exotic pines, found that the replacement of the indigenous cover by exotic plantations destroys at least 50% of the endemic litter insects, (more detailed work covering more niches in the forest floor suggests that the true figure approaches 90%). It is not known what long term effects this will have upon soil fertility and forest production.

4.4.3 Comment

In the past, the establishment of exotic forests has not been considered viable for economic reasons, and the poor growth rates experienced in the past.

However, the need to maintain employment and population in South Westland suggests that establishment of exotic forests should be considered.

It is likely that there is a need to plant species which have a competitive advantage to offset geographical location handicaps. The planting of exotic forests must be based on sound ecological principles.

4.5 NATURE CONSERVATION

> "Any land use policy for New Zealand should lay emphasis on the distinctive biological qualities of the New Zealand landscape, and seek to maintain and enhance them."
>
> (Molloy et.al.,1980,p.63)

Plate 20. Terrace rimu forest. (Photo, G. Loh)

4.5.1 The Forest Resource (Plate 20)

The forests of South Westland, North Westland, Fiordland and Nelson, form the largest continuous area of indigenous forest left in New Zealand. These forests represent the remnants of the country's original natural heritage (Coker and Imboden, 1980).

Due to the continuing evolution of native fauna and flora in isolation from other continents, and the absence of browsing animals, the forests of New Zealand now more closely resemble the forests of Gondwanaland than do any other Southern land mass.

There are a number of lagoons and lakes which have important conservation values, (Table 8).

4.5.2 Fauna

The forests of South Westland play the role of a large reservoir for native bird communities where the individual species can maintain their crucial genetic diversity by having access to a great number of different forest types at different altitudes and in different topographical situations (Coker and Imboden, 1979).

The lowland forests are particularly important for wildlife, as they support a generally richer resident avifauna than hill country. They are also an essential winter habitat for many birds living in higher altitude forests. These include Tui, Bellbird, Kaka, Parakeat, and Pigeons.

TABLE 8 HABITATS OF NOTE

(Coker and Imboden 1980)

Habitat Name	Size ha	Value	Habitat Description
Inland Swamps			
Wanganui River Flat	320	2	Flax swamp→kahikatea
Pye Creek Swamp	70	2	Flax swamp with open water
One One River	810	3	Rushes, flax swamp → kahikatea
Saltwater State Forest swamp	160	3	Flax, rushes *Coprosma* Spp., open water
Lakes			
Lake Ianthe	550	4	Lake with associated swamp
Lagoons and River Mouths			
Wanganui River mouth	160	2	Sandy beach
Saltwater Lagoon	850	4	*Leplocarpus* Podocarp surround
Indigenous Forest			
La Fontaine bush	10	1	Totara, Matai
Upper Poerua Valley bush	200	3	Podocarp/hardwood
Poerua River Mouth - kahikatea	2550	3	Kahikatea predominantly some other Podocarp
Abut Head	470	3	Coastal Podocarp/hardwood

KEY

4 = outstanding
3 = high
2 = moderate
1 = potential
→ denotes vegetation succession

It should be noted that today 20% of New Zealand's native birds are considered endangered species, Fielder, (1979).

South Westland Landuse Study (1977) identified two coastal faunal colonies, within the study area. These were ranked as areas of intermediate significance for conservation.

Wanganui Bluff area; - contains a seal colony at Greens beach. In August 1972, 385 seals were observed.

Abut Head; - The seal colony is estimated to have a population ranging between 40 - 200 at different times.

4.5.3 Wildlife Values of State Forests

Coker and Imboden (1979) ranked Ianthe and Saltwater State Forests as having outstanding value for wildlife. Wanganui was classified as having high value.

Table 9 shows the species list for State Forests in the study area.

Several species which are sensitive to modification of their environment are found in Saltwater, Wanganui and Ianthe State Forests. These include parakeet species, South Island Robin, the falcon was found in Ianthe and Saltwater, and South Island fein bird in Saltwater.

TABLE 9 SPECIES LIST - STATE FORESTS

STATE FOREST	WAITAHA	IANTHE	WANGANUI	SALTWATER	POERUA	WAITANGI	OKARITO	WAIKUKUPA	KARANGARUA	HUNTS BEACH	MAKAWHIO	BRUCE BAY	OHINEMAKA	PARINGA	MATAKETAKE	OKURU	TURNBULL	WAIATOTO	ARAWHATA	CASCADE
FOREST BIRDS																				
Kiwi sp.·	●						●	●					●		●			●	●	
S.I. Rifleman	●	●	●	●	●	●	●	●				●			●			●		●
S.I. Kaka		●		●			●	●	●	●	●		●	●	●	●		●	●	●
Parakeet sp.	●	●	●	●	●		●	●		●	●	●	●	●	●			●	●	●
S.I. Robin	●	●	●	●	●	●	●	●												●
Yellowhead														●						●
Yellow-breasted Tit	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Brown Creeper	●	●	●	●	●	●	●	●	●	●				●	●	●	●	●	●	●
Falcon	●	●		●	●		●		●						●					●
Bellbird	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Tui	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Morepork		●	●	●		●	●											●		●
N.Z. Pigeon	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
S.I. Fantail	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Grey Warbler	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Silvereye	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Longtailed cuckoo	●	●	●	●	●	●	●	●	●		●	●		●	●			●		●
Shining cuckoo	●			●			●								●					
OPEN COUNTRY AND WETLAND																				
Kingfisher	●	●	●	●		●	●	●	●	●	●	●	●	●		●		●		●
Kea	●				●	●		●	●		●		●		●	●		●		●
Harrier	●	●	●	●		●		●	●	●	●	●	●	●	●			●	●	●
Pipit	●	●		●			●		●			●			●	●				●
S.I. Fernbird				●			●								●					●
Western weka							●	●												
Welcome swallow																				●
White-faced heron																				●
Pukeko				●																●
Blue duck	●																			●
Paradise shelduck									●											●
Grey duck		●	●	●								●	●			●			●	●
COASTAL																				
Fiordland crested penguin																				●
Little shag	●	●					●				●					●				●
Black shag		●									●	●	●		●	●		●		●
INTRODUCED																				
Blackbird	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Thrush	●	●	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●
Hedge sparrow	●	●	●	●	●		●	●	●		●	●	●	●	●			●	●	●
Redpoll	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Greenfinch	●	●				●	●	●		●	●	●		●	●		●	●	●	●
Goldfinch	●	●	●		●	●		●												
Chaffinch	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Yellowhammer		●	●		●	●		●			●	●	●	●	●		●			
House sparrow			●			●	●	●				●		●						
Skylark	●			●	●	●	●	●	●		●	●	●							

This table lists all birds recorded and presumably breeding in forested and non-forested areas (swamps, rivers) within the state forests of South Westland.

Source: Coker and Imboden, (1979).

4.5.4 Values of Indigenous Forest

i. Water and Soil Protection;

Forests prevent both moss movement and surface erosion. They control transfer of water from atmosphere to streams and from soil back to the atmosphere. The value of Westland forests in maintaining soil and water values is extremely high and only uses compatible with the protection function can be permitted.

ii. Nature Conservation

The conservation of nature recognises and provides for the following values of native forests:

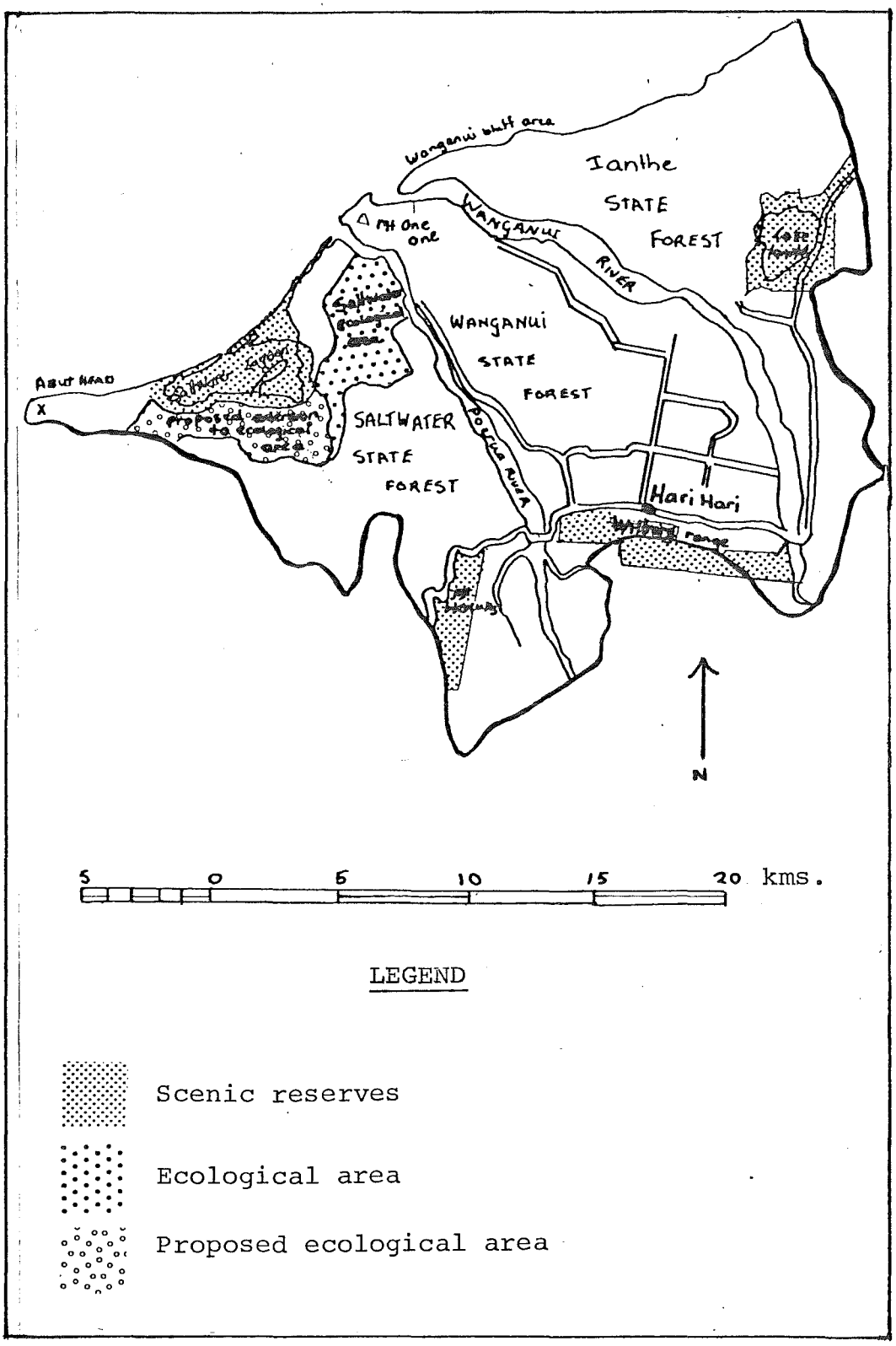
a. Scientific;- to ensure adequate reservation of representative examples of forest ecosystems to provide baselines for measurement of changes brought about by development, baselines for measurement of natural ecological processes, preservation of genetic material and protection of rare organisms. New Zealand native forests are regarded as internationally important, (Section 4.5);

b. Scenic values;

c. Spiritual and Cultural Values;- New Zealand's native bush is part of our natural heritage, and for many people it provides definition and meaning to life; and,

d. Recreation;- because Westland is isolated, with large tracts of land largely unmodified, its recreational values, especially for climbing, energetic tramping and hunting, are high. Lowland forests have a

Figure 8. Reserves.



special role, in that they provide tramping and hunting opportunities for the less fit and able. They also have a greater historic value as the remains of pack tracks are often evident.

4.5.5 Current Reserves (Figure 8)

i. Saltwater Ecological Area, (1,438 ha).

The area has important ecological and wildlife values, with high diversity and abundance of birds, and the presence of a high robin population(Coker and Imboden,(1979).

The proposed extension to Saltwater ecological area would add a further 1,347 ha to the reserve. This area includes the catchment to the lagoon.

ii. Scenic Reserves (Plate 21)

There are seven scenic reserves in the Hari Hari district, (Table 10). For details, reference should be made to McCaskill, (1975).

4.5.6 Representative Areas

The indigenous forest policy, sub-policy for reservation of forests for scientific purposes, stated that many indigenous forest ecosystems "....are of considerable scientific interest,and representative examples of each should be preserved in crown-owned forests....."

TABLE 10 SCENIC RESERVES IN THE STUDY AREA

Reserve	Area (ha)
Lake Ianthe	703
Salt water lagoon	354
Poerua River	178
Wilberg Range	828
Mt. Hercules	773
Total	2,836

Source: Wilkinson and Garratt, (1977).

Future options for forestry in the study area can not be considered without background knowledge of the present representation of ecosystems in South Westland podocarp forests.

It was noted above that the Westland forests are the only significant areas of lowland forest in New Zealand.

The Environmental Council (1979 , p.29) states:

> "The important lowland forests, which have been depleted, which are often the most diverse are the forests which are least represented in the whole reserves system."

Figure 9 shows the present altitudinal distribution of the forests of the moratorium region. To an extent this imbalance in protection of lowland forests will be partially rectified with the addition of the proposed moratorium areas covering South Okarito and Waikoukapa State Forests. But a moratorium does not necessarily ensure the protection of these forests.

One of the most poorly represented forest ecosystems are the Kahikatea forests.

Within the study area most of the forested land has been modified by logging or clear felled and converted to farm land.

Of the 23,243 ha of state forest land, 6,924 ha or 30% of this is in reserves. However, much of the reserves comprise protection forests and do not represent the

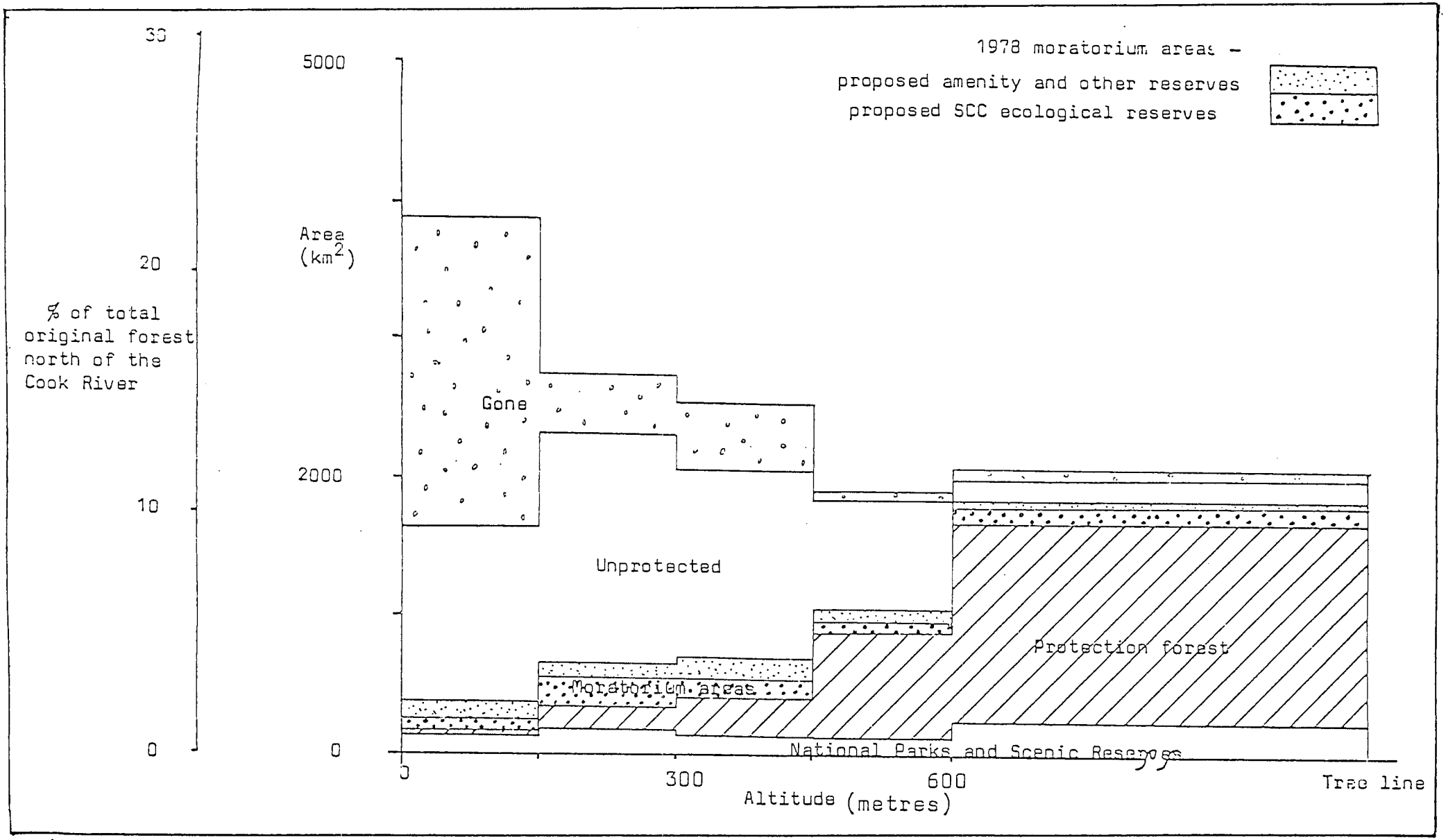


Figure 9. The altitudinal distribution of the forests of the moratorium region in pre-european times and now; divided into proposed uses.
(Environmental Council, 1979, from Dawson & Hackwell 1978).

rich flora and associated fauna of the lowland forests. Of the total lowland area zoned for production, only about 7% is currently reserved. The extension of Saltwater Reserve will increase this to approximately 13%.

Generally the early attitude of reserving only that which has little economic value, still exists today.

In assessing the adequacy of present reserves, it is necessary to consider not only their representativeness of forest ecosystems, but also their size.

According to Hackwell and Dawson (1980,p.8) the number of native birds that can survive in a forest decreases as the size of that forest is reduced.

> "We can expect to lose about 10 percent of our forest bird species for every halving of the forest area."

Biologists consider that most of the existing reserves are too small to avert further extinctions. The maximum area of native forest should be reserved in large patches (thousands of square kilometers), (Hackwell and Dawson, (1980).

There is urgent need for research into habitat requirements of native forest birds. Without this knowledge we can not be sure that the existing reserves are adequate.

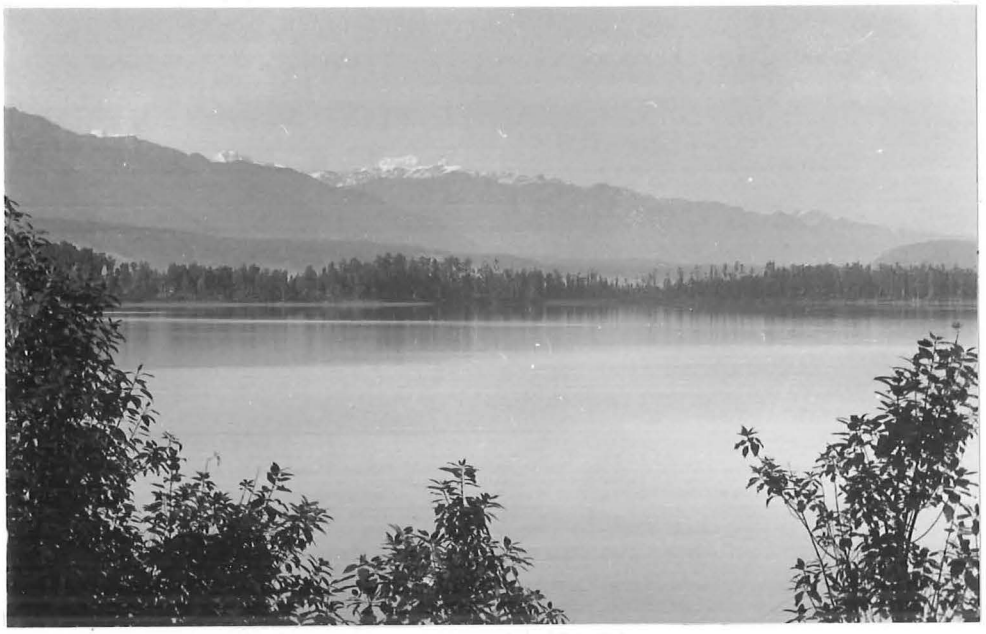


Plate 21. Lake Ianthe on a misty morning.
(Photo, Sue Maturin)

Plate 22. Looking towards Wanganui State Forest from Mt. One One.
(Photo, Sue Maturin)

4.5.7 Need for Further Research

The need for further research conserning nature conservation, and the representativeness of preserved ecosystems, is well documented in Molloy et.al., (1980), to whom reference should be made.

In summary, urgent research is required to provide;

a. Check list of all communities and landscape types found in New Zealand which should be protected.
b. A list of what communities and ecosystems are already contained in existing parks and reserves.

Without this information future land management decisions can not be adequately debated.

It was noted earlier that research concerning wildlife requirements must be increased.

4.6 RECREATION

State Forests in the study region include not only the forests, but also the associated water ways, lakes, coastal areas, beaches, river flats, swamps, wetlands and a lagoon, (Plate 22).

These areas offer valuable opportunities for recreational use, locally, regionally, nationally and internationally.

To date these recreational opportunities have been little used. There are a small number of tracks, few facilities are provided and information is not readily

available to would be users.

Molloy (1979,p.54) speaking of Saltwater lagoon and Lakes Rotokino and Ianthe, wrote;

> "These remarkable waterways are difficult to appreciate on foot - canoeing is by far the best form of travel."

Yet, despite the wide scope for recreational use in the area, little encouragement is given to promote recreation.

Trout fishing in the La Fontaine Stream and white baiting at the river mouths are popular past times.

4.7 MINING AND PROSPECTING

The study area is not known to contain rich mineral deposits. Today there are nineteen prospecting licenses, the majority of which are beach claims in the vicinity of Saltwater lagoon. In Section 4.5.1it was noted that Saltwater lagoon has important wildlife and scenic values. These values should be taken into account when considering mining applications, and appropriate conditions to license should be drawn up.

4.8 SUMMARY AND CONCLUSIONS

This chapter discusses the lessons of the past and highlights implications for future possibilities. Some of these implications are;

i. Agriculture

a. The legacy of large farm units has not encouraged farmers to farm their land intensively. Much of the land that is in production is not farmed

efficiently. The small number of farmers who have achieved high productivity per animal indicate that land in Hari Hari is capable of producing considerably more than it does at present.

b. The best means for achieving an increased production may be through more efficient farm management and not necessarily by bringing the remaining undeveloped land into production.

c. One of the main reasons given for not wishing to increase production was that many of the farmers consider their way of life is more important than the need to increase production.
It may be possible to increase production through rationalising farm boundaries, so that farmers would be encouraged to farm more intensively.

d. Efficient farm management is hampered by a lack of information concerning the physical and climatic environment. Research into these areas needs to be conducted if farm production is to increase in Hari Hari.

e. The major natural constraints limiting farm efficiency are the low soil fertility and threats of flooding. Large and continual applications of fertiliser are required to maintain productivity.

These are a major farm expense. It may be possible that a more detailed understanding of soil types and their fertiliser requirements would lead to more efficient fertiliser applications. The need for considerable flood protection work reduces the viability of farms adjacent to the rivers. (Plates 23 and 24).

f. Alternative farming types, such as deer and opossum farming and bee keeping, offer possibilities for agricultural diversification.

ii. Indigenous Forestry

a. Results of past logging systems indicate that the goal of sustained yield has yet to be achieved.

b. Sustained yield has not been achieved due to timber volume losses from windthrow and physical damage, which exceed natural increment in timber volume.

c. A review of knowledge of rimu ecology suggests that despite continual research,knowledge concerning stand structure, windthrow,regeneration, and growth processes remain poorly understood.

d. Research trials have not included assessment of soils and other broader aspects and factors of the forest ecosystem.

Plate 23. The flood prone Wanganui River: Since this photograph was taken the river has changed its course. The pylon is now in the middle of the river.
(Photo, Sue Maturin)

Plate 24. The Wanganui River: Since this photograph was taken the river has taken much of the farmland on the right hand side.
(Photo, Sue Maturin)

e. The unsatisfactory results from current logging systems have prompted research into new management systems. There is an increasing emphasis on a better understanding of forest structure, but continuing disregard for other components of the forest ecosystem.

f. The need for forest management to be based on an understanding of the entire ecosystem is clearly required.

g. There is an important need for a detailed soil survey sample to provide the basis for a greater understanding of the forest ecosystem.

h. The potential of exotic forestry has not been thoroughly researched. Before exotic plantations are considered, there is an urgent need for further research.

iii. Nature Conservation

a. The early attitude of reserving only that which has little economic value still exists. As a result, lowland forests are poorly represented in the present reserve system.

b. Biologists are concerned that many of the existing reserves are too small to avert further extinctions of forest birds. Until the habitat requirements of forest birds and other native fauna are known we can not be sure that the existing reserves are

adequate. There is an important need for research in this area.

In conclusion, it appears that agriculture is an efficient form of land use in Hari Hari, and that there is potential for increasing production and diversification into other activities; for example, deer farming, opossum farming and bee keeping. However, more information is required concerning the physical and climatic environment, and this would enable agriculture to become better adapted to the local environment.

Current practices of indigenous forestry indicate that present forest management is not well adapted to the forest ecosystem. This suggests that it should be discarded until more appropriate methods have been found.

Chapter Five

The Human Resource

5.0 INTRODUCTION

The human resource is defined as that population (employed, non-earning dependents, social welfare beneficiaries, retired persons) living within the study area.

This population represents Hari Hari community.

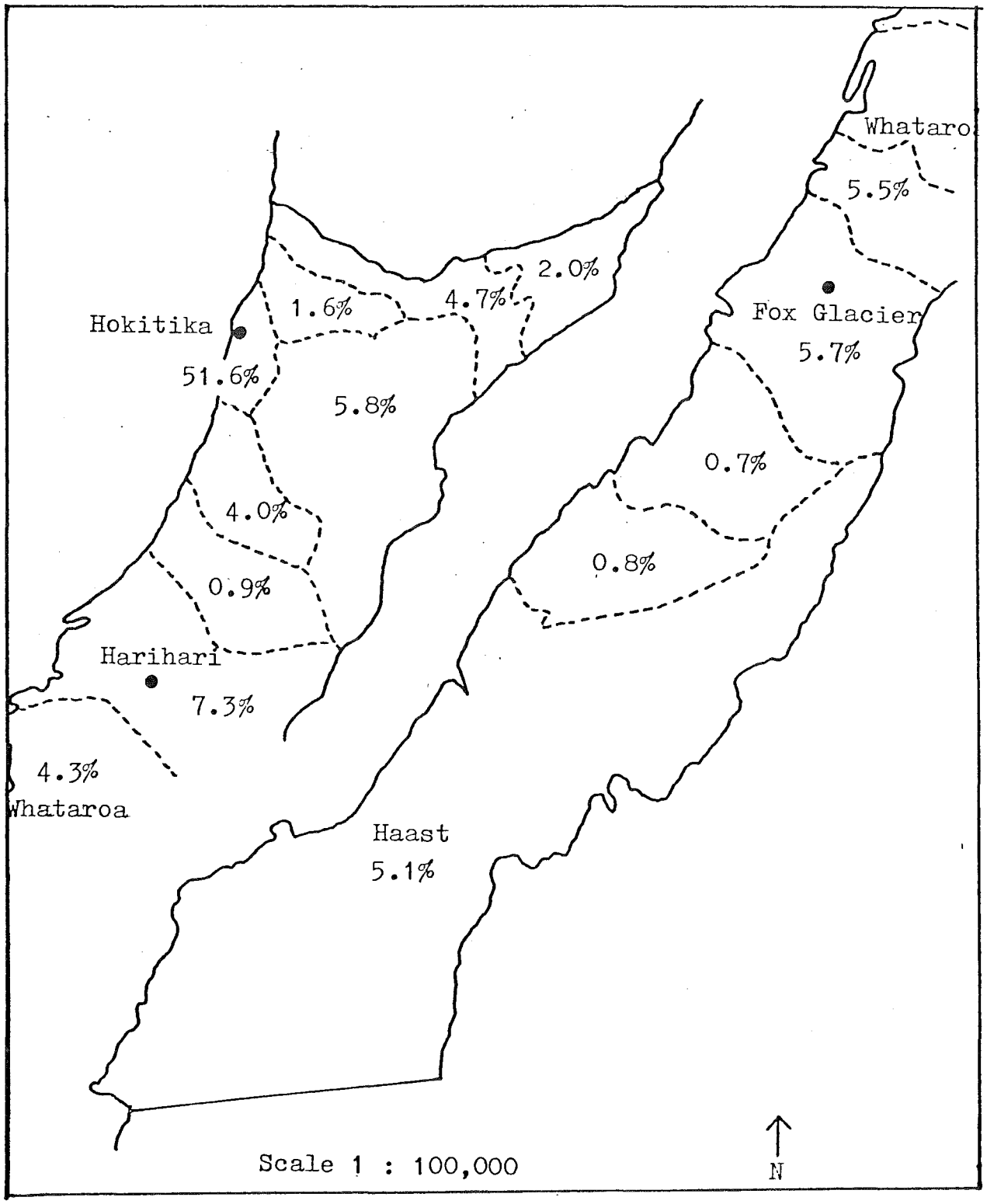
To determine the role that each activity has in supporting the community, the population structure and the structural organisation of the economy must be understood.

This chapter describes the settlement pattern, population structure, and the economy of Hari Hari. The data in this chapter provides the base for chapter eight, Impact of the Saw Mill Closing upon Hari Hari,and Alternatives for the Future.

Plate 25. Hari Hari township from the air.
(Photo, A. Griffiths)

Plate 26. Hari Hari township from the ground.
(Photo, Sue Maturin)

Figure 10. Population distribution within Westland District 1976.



Key

——— District boundary

- - - Local community boundary.

Source: Bennett, (1980).

~~This chapter shall describe the settlement pattern, population structure, employment and the economy of Hari Hari.~~

5.1 SETTLEMENT PATTERN

The population of Hari Hari is concentrated on the wide valley flats of the Wanganui, and Poerua Rivers. The location of the township is illustrated in Plate 25. Plate 26 illustrates the township.

5.2 POPULATION TRENDS

The population has increased from 423 in 1945, to 693 in 1976. A further 124 people live on farms on the central flats and the remaining 26 people live north of Hari Hari at Evans Creek (Bennett, (1980).

Hari Hari is one of the few towns on the West Coast that has maintained steady growth in the last thirty years. Hari Hari is the largest community in the Westland district, excluding Hokitika, and contains 7.3% of Westland's population. (Figure 10)

Since 1976, the population has declined due to a decrease in employment opportunities. The 1980 population has been calculated in Appendix B. It is estimated that the present population is 610.

TABLE 11 FUNCTIONS AND EMPLOYMENT 1976

Basic	No. Units	Full Time	Part Time	Labour Units	% Labour Units
Forestry - N.Z. Forest Service	1	49	1	49.5	16.9
Sawmilling	2	49	1	49.5	16.9
Farming	60	84	11	89.5	30.8
Ministry of Works & Devlop.	1	20	1	20.5	7.0
Hotel 1	1	14	7	17.5	6.0
Tea Rooms	1	2	1	2.5	0.9
Fish Processing	1	2	-	2.0	0.7
Hunting 2	2	2	-	2.0	0.7
Motel	1	-	1	0.5	0.2
Mining	1	-	1	0.5	0.2
Basic Total	71	222	24	234.0	80.3
Services					
Area School	1	16	8	20.0	6.8
Road Freight	1	8	-	8.0	2.7
Local Authority	2	8	-	8.0	2.7
Retail	3	6	3	7.5	2.6
Garage	1	5	-	5.0	1.7
Private Contractor	3	4	1	4.5	1.6
Religion	2	1	1	1.5	0.5
Post Office	1	1	-	1.0	0.3
Health	1	1	-	1.0	0.3
Stock Agent	1	1	-	1.0	0.3
TAB	1	-	1	0.5	0.2
Service Total	17	51	14	58.0	19.7
TOTAL	88	273	38	292.0	100.0

1. Hotel - serves both the visitors and the "locals". It is thus a basic and service industry.

2. Hunting - underestimated.

Source: Ministry of Works and Development (1976).

TABLE 12 HARI HARI EMPLOYMENT JANUARY 1980

Basic Sector	No. Units	Full time	Part time	Labour Units	% Labour Units
Farming	54	82	11	87.5	36
N.Z.Forest Service	1	33	1	33.5	14
Sawmilling	1	21	-	21.0	9
M.W.D.	1	20	1	20.5	8
Hotel	1	11	8	15.0	62
Tea rooms	1	2	3	3.5	1
Fish processing	1	-	2	1.0	.4
Hunting	2	2	-	2.0	1
Motel	1	-	2	1.0	.4
Goldmining	1	2	-	2.0	1
Basic Total	64	173	28	187	77
Service Sector					
Area School	1	16	9	20.5	8
Road Freight	2	8	-	8.0	3
Local Authority	1	9	1	9.5	4
S.W.Savings Bank	1	-	2	1.0	.4
Retail	1	2	2	3.0	1
Garage	1	3	-	3	1
Private contractors	3	4	-	4	2
Religion	2	1	1	1.5	.8
Post Office	1	1	1	1.5	.8
Health	1	2	2	1.0	.4
Stock agent	1	1	-	1.0	.4
T.A.B.	1	-	3	1.5	.8
Service Total	16	45	21	51.5	23
Total	80	218	49	238.5	100

5.3 EMPLOYMENT

Tables 11 and 12 show employment in Hari Hari in 1976 and 1980 respectively. Since 1976 employment in sawmilling and N.Z. Forest Service has declined. The bulk of employment is provided by farming followed by N.Z. Forest Service, sawmilling and the Ministry of Works.

A feature of employment is the number of Government Department and Local Authority employees. Together they make up 21% of the full-time work force. These include:

a. Westland Area School.
b. Ministry of Works and Development depot.
c. Westland Power Board District Office.

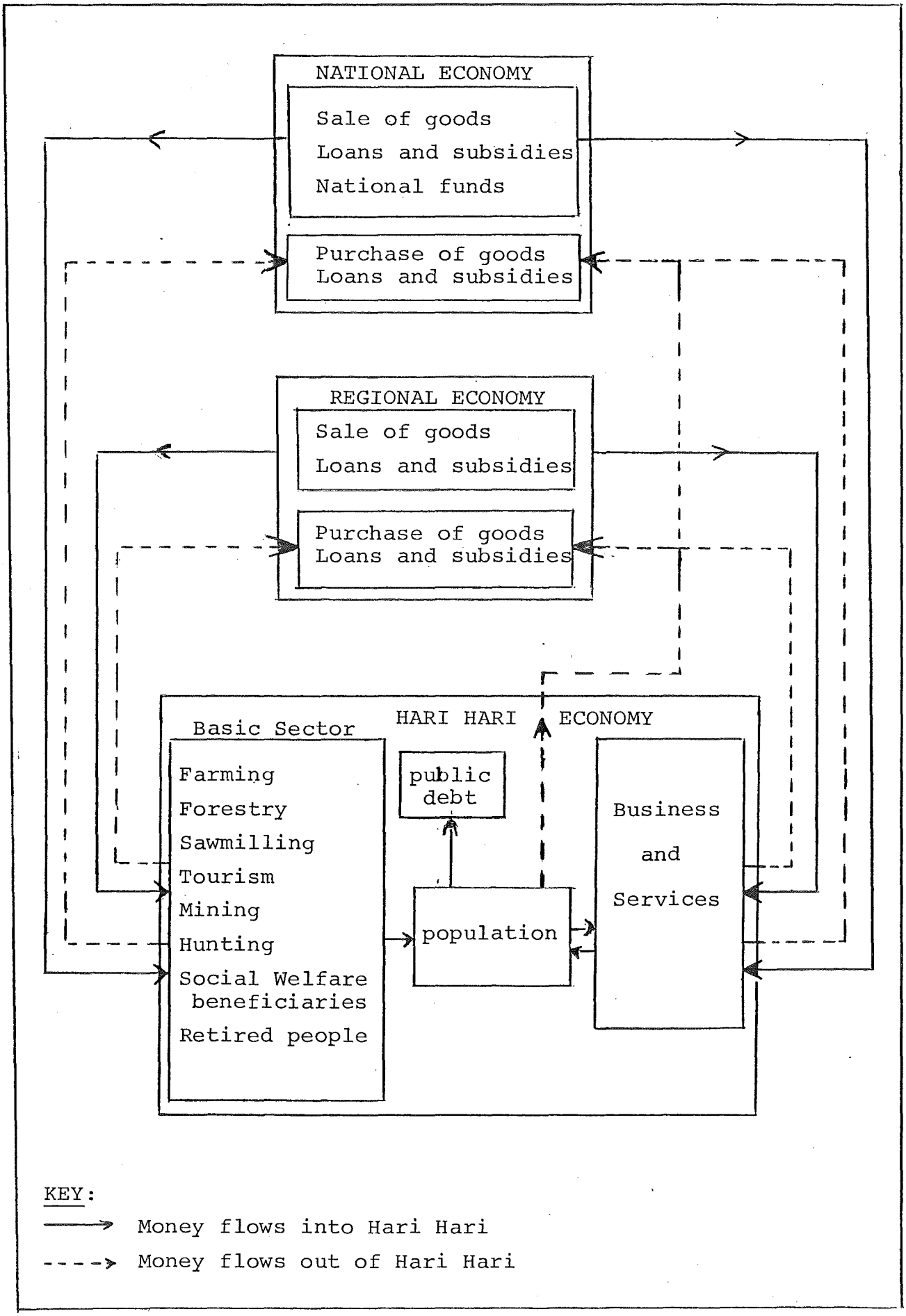
These activities have helped Hari Hari become one of the most progressive areas on the West Coast, (Bennett, 1980).

Future employment trends will be dependent upon the future of the sawmilling industry, and opportunities for alternative employment. These will be discussed in detail in Chapter seven.

5.4 THE HARI HARI ECONOMY

The local economy is represented in Figure 11 which illustrates the interrelationships between the component employment activities in terms of employment and income flows into, within and out of the district.

FIGURE 11 THE HARI HARI ECONOMY



The economy comprises two sectors, defined as the basic and service sectors.

5.4.1 The Basic Sector

The basic sector includes those industries based on natural resources, and Social Welfare beneficiaries and retired persons receiving National Superannuation. This sector generates employment and population, and creates the initial demand for goods and services.

Income flows into the district from the sale of goods and loans from the regional and national economies.

The Hari Hari economy is relatively simple in that most of the commodities created by the use of the district's natural resources, are exported unprocessed from the district, and are not distributed within the economy. The export of raw materials for processing elsewhere means that full value of the product is not realised within the community. This is represented as income flows out of the district, as payment for processing goods.

The purchase of goods and services outside the district also represents income lost from Hari Hari.

Some goods and services are purchased within the economy providing income flows to the economy. It is this income which provides the bulk of support for businesses and services. Consequently any change in the level of activity in the basic sector will be

reflected throughout the community.

5.4.2 The Service Sector

In addition to the above income, some services are supported by national funds and the amount of support is dependent upon the level of local demand for the services. A small percentage of income to this sector is derived within the sector itself. Income flows from the service sector, out of the district, through the purchase of goods and services from the regional and national economy.

5.4.3 Servicing Public Debt

Some of the community services, and facilities are financially supported by the Hari Hari population. The viability, and quality of these services, are dependent upon the population size.

5.4.4 Role of the Basic Sector in Supporting Employment

Table 12 indicates that the basic sector supports 77% of total work force in Hari Hari. Farming supports 36%, N.Z. Forest Service 14%, and sawmilling 9%. The total forest industry directly supports 23% of the total workforce.

The role of forest industries in supporting West Coast communities was assessed by Stapleton, (1977). Stapleton found that total forest industries contribution varied from 7% in Franz Joseph, 27% in

TABLE 13 N.Z. FOREST SERVICE AND SAW MILL POPULATION

Activity	Single	Married	Dependent Children	Total Pop.
Sawmilling	16	15	17	63
Forestry	20	13	36	82
Totals	36	28	53	145

Whataroa and 33% in Hari Hari. These compare with forestry's contribution of 10% to total employment in the whole West Coast region.

5.4.5 Forest Industry Support for Population

Table 13 indicates that 145 people are supported by the forest industry; this is 24% of the total population.

5.4.6 Role of Basic Sector in Supporting Businesses and Services

Data concerning the role of the basic sector in supporting businesses and services, was obtained from interviews with the respective managers/owners of each business and service.

Table 13a indicates that the total basic sector provides 81% of the income to businesses and services, and the remainder is supported by the service sector, and tourists. Farmers support 33%, N.Z. Forest Service 16%, and sawmillers 20% of the businesses, and services. Farmers provide the greatest percentage of support to the garage, general store, Arnold Transport, and the school. The Forest Service population provides the greatest percentage of support to the T.A.B., South Westland Savings Bank and a large percentage of support for the general store, Arnold Transport, hotel bar, and Health Clinic. The sawmilling population provides the greatest

TABLE 13a ROLE OF BASIC AND SERVICE POPULATIONS IN SUPPORTING SERVICES AND BUSINESS EXPRESSED AS % OF INCOME - ESTIMATE ONLY

	Farmers	% of N.Z. F.S.	% of Sawmill	% of Govt. Dept.	% of Own Business	Retired & Others & Beneficiaries	Tourists	Totals
Garage	70	5	3	6	5	1	10	100
Tea-rooms	30	9	5	8	7	1	40	100
General store	48	16	12	9	8	3	4	100
T.A.B.	5	22	20	22	15	1	15	100
Trans-West	22	-	36	20	22	-	-	100
Arnold Transport	70	15	15	-	-	-	-	100
S.W.S.B.	15	33	15	18	15	4	-	100
Hotel Bar	6	24	32	19	9	1	9	100
School	490	8	17	11	8	7	-	100
Health	10	31	50	5	2	2	5	100
Total %	33	16	20	12	9	2	8	100

NOTES:

Total basic support for services and businesses = 81%

Total services and businesses - support for services and businesses = 11%

Total tourist support for services and businesses = 8.0%

percentage of support for the T.A.B., Trans West, Arnold Transport, hotel bar, school,and Health Clinic.

The validity of these results is dependent on the assumption that the managers/owners of each business, and service correctly identified and categorised their customers,according to each of the employment sectors,and that they were able to reliably estimate the relative proportions of money spent, by each sector.

Accordingly, these percentages are estimates only, and should only be used as guidelines to indicate relative proportions of support from each sector.

5.5 SUMMARY

i. Settlement pattern, population trends, employment were described. It was found that population and employment has declined since 1976.

ii. The importance of farming, N.Z. Forest Service, sawmilling, Ministry of Works, State,and Power Board in providing the bulk of employment, was recognised.

iii. The growth of Hari Hari compared to other West Coast communities is largely due to the establishment of Government Departments and the Power Board.

iv. The Hari Hari economy was described. It was found that the basic sector plays a crucial role in supporting the economy. Of this sector, farming and the N.Z. Forest Service provide the greatest employment, and population but farming and sawmilling provide the bulk of support for services and businesses.

Chapter Six

Community Characteristics

6.0 INTRODUCTION

The way in which land is used to produce goods, provide employment and income determines not only the economic structure of the Hari Hari community but also the social structure and way of life. Inevitably a change in land use will affect all aspects of the community. It was noted earlier in this study that a decline in the timber industry is inevitable and as a result employment in Hari Hari is likely to decrease.

To understand the likely impact resulting from such a change it is necessary to understand the life style characteristics of the community, the needs of the community and the demands that arise from them.

A study which merely points out the resulting impact upon the community would contribute little towards the future of Hari Hari. It is essential, if the community is to be maintained at its present population level, that alternative employment opportunities are created.

Accordingly we need to know:

1. What attracts people to Hari Hari and why others leave;
2. What can be done to enhance the social conditions, to create an attractive and satsifactory environment, in which to enjoy life and create a quality of life worth living;
3. What kind of alternative employment is compatible with community values; and,
4. what kind of alternative employment is envisaged by the community. Gilles, (1979), noted that schemes for rural social development are most successful when they are formulated and carried out by local residents.

A planner can not know all these things, thus it is essential that local opinion be sought; indeed this should be the first principle of planning.

This report aims to answer the above questions through the examination of the life style characteristics of Hari Hari portrayed to me by the local people.

Life style characteristics may be described as being composed of two essential elements, activities and values. Community activities include those associated with employment, which in part determine the social structure of the community, and those of leisure time, which indicate some of the social needs of the community. Community values may be defined as those aspects of Hari Hari which are regarded by the community as being significant to their way of life.

6.1 METHODOLOGY

The method used for this research is based on an approach which may be described as that of Participant observation. This is defined by Schwartz, (1955),p.343, as:

> "A process in which the observer's presence in a social situation is maintained for the purpose of scientific investigation. Further the observer is in a face to face relationship with the observed and by participating with them the person gathers data."

The data for this report were gathered through observation and through interviews. I spent four months living in the Hari Hari community, participating as much as possible in the various daily activities of the community.

Formal interviews were conducted with eighty-two people, representing people from the major employment sectors. Information regarding clubs and organisations was obtained from twenty people representing these activities.

In addition the fourth, fifth and sixth form students from the South Westland Area School were asked to fill in a questionnaire, Appendix E.

The interviews were of two types;

1. Informal discussions; these took place when the chance arose, and occurred most often in the shops, on the street, at meetings and functions and in the hotel. These discussions are not included in the number of formal interviews, but were used as a form

of observation and in an attempt to broaden an overall understanding of the community.

2. Formal interview conversation; these interviews were conducted in peoples' homes and their place of work. They were informal in the sense that a structured survey questionnaire was not used. These interviews were open conversations, during which I guided the conversation in the required direction. The interviewees were asked to comment upon the following:
   a. Their reasons for living in Hari Hari;
   b. their future plans;
   c. issues important to the community;
   d. their attitudes towards the community;
   e. their leisure time activities;
   f. attitudes towards the future of the community;
   g. alternative employment opportunities; and,
   h. their attitudes towards agriculture, forestry, and nature conservation as land uses.

   These interviews were recorded in note form on the spot and written up immediately following the interview. Each interview lasted between an hour and a half to two hours.

6.1.2 Population Sample

The size of the population sample was dictated by the amount of time available for research. A total of eighty-two adults and twenty-three high school students were interviewed. This represents 17% of the total 1980 estimated population of 610, Appendix D.

TABLE 14 POPULATION SAMPLE EMPLOYMENT CATEGORY

Activity	Total full-time Employees Interviewed	Total full-time Employees 1980	% of full-time Employees Interviewed	Number of Home Business Interviewed
Farming	21	84	25	5
Forestry	8	32	25	4
Mill	10	21	48	8
Business	8	32	25	4
Government Departments	9	38	25	5
Totals	56	207	-	26

TABLE 15 POPULATION SAMPLE MALE/FEMALE

Employment Population	Male	Female	Total
Farming	13	13	26
Forestry	8	4	12
Mill	10	8	18
Business Government Departments	8	4	12
	8	6	14
Totals	47	35	82

It was considered important that the sample should be representative of the employment sectors within the community. Accordingly 25% of each employment sector, excluding the saw mill employees,were interviewed. It was assumed that the mill population would be the sector most affected by a change in land use. Consequently half this population were interviewed.

Employment population refers to the employee and their husband or wife. Tables 14 and 15 show the population sample.

The process of selecting interviewees involved categorising the population into the specific employment sectors.

a. Farming population.
b. New Zealand Forest Service population.
c. Mill population.
d. Government department population, this includes the Ministry of Works, Power Board, Area school, and the Post Office and excludes the Forest Service.
e. Business population, this includes those who own a business or are self employed and those who work in these businesses.
f. Home business people, those in unpaid domestic work.

This was done with the help of a local school teacher who knew most people and their occupations. The sample from each employment population was randomly selected. The farming community was to an extent a stratified random sample in that it was necessary for the purposes of

obtaining agricultural information to ensure that the farming sample included both low and high producing farms.

High School Students

All fourth, fifth and sixth form students were asked to answer a written questionnaire. Research time did not permit a representative sample of high school students to be personally interviewed. Responses were collected from all forty-three students who received the questionnaire. Of these eighteen students came from areas outside Hari Hari, (Table 15a). These students are not included in the population sample for this report.

6 1.3 Presentation of Data

This chapter is divided into four sections; community activities, community values, community future and attitudes towards land use. The small size of the population sample does not enable the data to be presented in a quantitative fashion. Instead, the information is primarily descriptive and is presented in a narrative form. The narrative is divided into a number of subheadings according to the issues raised during the interviews. The number of people raising the issue is given. Thereafter the number of people expressing particular views are referred to as;

majority/most	greater than 54%
some	15-54%
few	less than 15%

TABLE 15a POPULATION SAMPLE SOUTH WESTLAND AREA SCHOOL

Class	From Hari Hari Female	From Hari Hari Male	Outside Hari Hari Female	Outside Hari Hari Male	Totals
Fourth Form	6	6	5	7	24
Fifth Form	5	4	3	3	15
Sixth Form		4			4
Totals	11	14	8	10	43

A large number of quotes taken from interviews, which best reflect the general beliefs of the community, are included to help the reader better understand the spirit of the community. I believe that they add "heart-felt" expression to the report. It is hoped that no offence shall be taken from them.

6.2 COMMUNITY ACTIVITIES

Community activities comprise those associated with employment and those of leisure time.

6.2.1 Employment

The type of employment provided in Hari Hari determines the social structure of the community and influences community activities.

i. Employment for Men

The dominant forms of employment require physical activities and are traditionally male activities, such as forestry, farming and sawmilling, Ministry of Works and the Power Board. With a high proportion of jobs demanding physical fitness, the population is dominated by people with young families and single men.

ii. Employment for Women

The majority of women in the township are employed in part-time jobs, only a few have full-time jobs. Their employment is restricted to household maintenance, teaching, hotel work, shop assistants, clerical and cleaning. The sharp distinction between employment

activities for women and men, is reflected in many other aspects of life in Hari Hari. The distinction is not so sharp amongst the farming community as most of the women share farm work with the men.

> "Forestry and Ministry of Works, leads to a male dominated society, there are a lot of single men, but there are no real occupations for women."

6.2.2 Work Satisfaction

Most of the men considered their jobs reasonably satisfying and enjoyable, with the exception of some sawmillers. While some enjoy working in the mills, many believe they have no future. For these people their work in the sawmill is a job, which is not particularly enjoyable but it provides an income.

One sawmiller remarked:

> "At one time people were keen to learn all the various jobs but now they are just interested in getting their pay packet and away home."

While a few of the sawmillers might move from one mill to another, eight out of nine interviewed had tried their hand at all sorts of employment, and would do so again when they leave the mill. This is not so true of the bushmen, for they are skilled people and are not so readily prepared to do any kind of job. When they leave they will move to other bushmen jobs around the country.

Although there are jobs available for women, for most they are not the jobs they would choose if they had any option.

This does not apply to the teachers. Most of the working women work because they need the money, and for something to do. Work is as important to them as it is for the men. However, in general the women are less satisfied with their jobs than the men.

6.2.3 Employment for School Leavers

There are very few jobs for school leavers, consequently most leave the district. Table 16 shows future plans of the high school pupils. The majority of students, (80), indicated that they wish to become trained in jobs which necessitates them to move away from the West Coast. Table 17 shows the students' intended careers.

The greatest proportion of these students (69%) indicated that they have no wish to return to the West Coast. When asked if they would return to Hari Hari, if suitable jobs were available 59% stated they would and 41% said no. Those who indicated that they would return to Hari Hari, most said they would do so only on the condition that the jobs of their original choice were available. Only three students indicated they would forgo their careers if jobs were available with the Forest Service, garage, post office, Trans West or on farms. This suggests that careers are more important to students than their choice of residence. Those who said they did not intend to return to Hari Hari, considered that Hari Hari offered little social life and was too isolated from larger centres.

TABLE 16 CAREER PLANS OF STUDENTS

(Interview Sample)

Class	No. Inter-viewed	Intend to stay	To Univ.	Job Train-ing	Job	Hope to return to the Coast to live
Fourth Form						
Female	6	-		4	2	2
Male	6	2		3	1	
Fifth Form						
Female	5	-	2	2	1	2
Male	4	-	1	3	-	-
Sixth Form						
Female	-	-	-	-	-	-
Male	4	-	-	4	-	1
Total	25	2	3	16	4	5

The high proportion (80%) of students desiring job training may be a consequence of the school's current vocational guidance programme.

An earlier study of West Coast High School students found that only 5% of the pupils planned to undertake job training (Houghton, 1979).

These trends may cause considerable social disruption, as students will be forced to leave the West Coast for job training.

It was found that the majority of families intending to shift from Hari Hari sited their main reason for moving was for their children's occupational opportunities. (Section 6.4.12.) Most of the families would prefer to move to a larger centre on the West Coast, but most children intend to shift away from the West Coast.

One can conclude from this that,should the students realise their intentions, and the parents their wish to maintain close ties with their children, it follows that many families will leave Hari Hari and the West Coast.

With increasing emphasis upon the need for job training, it is probable that this trend will increase in the future and may lead to considerable population losses from the West Coast. This is a hypothesis and requires further investigation. However it does suggest a need

TABLE 17 SOUTH WESTLAND AREA SCHOOL STUDENTS

INTENDED CAREERS

FEMALE	MALE
Hair dressing	Navy
Typist	Police Force
Veterinary Surgeon	Royal New Zealand Air Force
Teaching	New Zealand Army
Graphic Design	Carpenter
Architectural Draughting	Mechanic
Nursing	Civil Engineer
	Welding
	Stock Agent
	Farm Advisor
	Teaching
	Computer operator

for the establishment of job training schemes and a need for a greater choice of jobs on the West Coast.

6.2.4 Social Groups

A feature of the community is that many people work in one type of employment, for instance, sawmilling, forestry, Ministry of Works and Development and the Power Board and farmers.

Each of these activities form relatively distinct community groups, who know each other well but tend not to know the other groups so well.

> "At the pub people often stick in groups, for instance, the sawmillers and the Ministry of Works. But you can always go over to them with a glass in hand and have a natter."

A large proportion of the Forest Service employees are single. These people are transient and do not mix widely with the rest of the community. It was often commented by the town folk that;

> "You no sooner meet them and they have gone."

6.2.5 Accommodation

The dominant employers, the Forest Service, sawmill, Ministry of Works, Power Board and the Education Board provide cheap rental accommodation. Each sector has a distinctive style of house which in most cases are grouped together. This tends to reinforce the social groups. (Plates 27-29).

Plate 27. A power board house. (Photo, Sue Maturin)

Plate 28. The forestry village. (Photo, Sue Maturin)

The Forestry Village

The Forestry Village is separated from the rest of the community. Most people find this unsatisfactory because the people in the village do not get to know other members of the community and the community do not get to know them.

Some town folk dislike visiting the forestry village because they feel as if they are intruding.

The Mill Houses

The accommodation provided by the Mill is of lower standard than other rented houses. Many of the people whilst appreciating cheap rents, find their houses too small and unattractive.

"We may as well be living in a batch.".

The mill houses do little to enhance the attractiveness of Hari Hari.

There are very few privately owned houses in Hari Hari and many people believe this is a problem. It was suggested by some people, not living in the rented houses, that as a result of not owning their own houses many people especially the women, are bored and have little to look forward to. Whilst the men have little else to do but to join clubs or go to the hotel.

Although none of the occupants of the rented houses raised this point, many indicated that eventually they would like to own their own home. A few of the mill

Plate 29. Mill houses. (Photo, Sue Maturin)

Plate 30. Private house. (Photo, Sue Maturin)

employees have purchased their houses from the mill. However, others are unwilling to do so for the following reasons.

1. Uncertainty of the future of their jobs at the mill.
2. They do not intend to stay in Hari Hari.
3. They do not like the houses.

6.3 LEISURE ACTIVITIES

The dominant community activities, like the dominant employment activities, require a high degree of physical fitness.

6.3.1 Sport and Social Clubs

Sport and social clubs are a dominant feature of the community social life for adults and children alike. They are the medium through which many people get to know one another within the Hari Hari community, and within other rural communities. There are thirteen sports clubs in Hari Hari and over thirty organisations (appendix F).

Common comments were:

> "People around here are great, they take part in most sports and clubs."
>
> "There is a good community spirit, lots of clubs and sports."

The majority of people belong to more than one organisation. The busy social calender was often commented upon with pride, as they believe that the social life of Hari Hari is unique amongst small rural townships.

> "There are that many things on, that it is difficult to get a night at home, especially during the winter."

Although most sports comments were favourable there were some who thought that:

> "Sport especially rugby has become too serious and competitive, and the attitude of being out to win is prevalent."

These people considered that if the population was to decline, the community would go back to what it used to be and would be much "more fun."

There was a general opinion that there are too many organisations, competing with each other for members, and that the community would be better off with fewer clubs, but each having more active members.

> "There are too many clubs now, each competes for members. For instance, indoor bowls once had 68 members but once badminton started bowls dropped to 30 members."

6.3.2 Community Participation

It is interesting to note that in most cases it is the business community, Government Department population and the farmers who are the most active in the organisations and clubs, (Table 18).

Due to the nature of employment, most people do not stay long, thus the majority of the township population is relatively transient.

The mill workers and the Forest Village people seem less inclined to participate as much in community affairs as the other sectors of the community.

TABLE 18 PARTICIPATION IN COMMUNITY ACTIVITIES

	Farmers	Mill Workers	Forestry	Town
1. The Fire Brigade	-	3	3	11
2. St. Johns	9	3	3	-
3. Indoor basketball	-	-	-	-
4. Badminton	4	4	8	4
5. Squash	17	13	10	22
6. Netball	2	1	2	10+
7. Rugby S.Westland team	predominantly farmers			
8. 2 church guilds	15	4	2	4
9. Country Womens Institute	18	2	4	-

Many people attributed this fact to the isolation of the Forestry Village and the more transient population and that the mill workers spend more time at the hotel.

Others suggested that it was because they are not likely to become permanent residents and therefore do not wish to become involved in community activities.

6.3.3 The Hotel

The hotel is an important focal point for the men folk in the township, but not for the women;

> "It is a place to meet people and have a good yarn."

Most of the farmers in the district attend the hotel only occasionally, whereas the men in the township go regularly.

It was interesting to find that there is one group of farmers who make an effort to go to the hotel once a week.

The majority of women in Hari Hari do not go to the hotel, although some accompany their husbands on Saturday nights. Many women stated that they prefer to stay at home and look after their children than go to the hotel. Others feel that the hotel is dominated by males, and women are not welcome.

> "You get the same old people up against the bar, its dull, the men stick in groups and there is not a good atmosphere."

> "The pub is not an enjoyable place for women, with men in old dirty clothes and bad language."

Thus, while the men meet people through the hotel, and in most cases know a large proportion of the community, the women,who do not go to the hotel, get fewer regular chances to meet people and consequently know fewer people.

The hotel was owned by a local person, before being taken over by Dominion Breweries. Since then, there have been a number of changes. A regular Sunday night wine and dine for the whole family was discontinued, the bar was altered, the private bar is now opened less frequently and a band is even more seldom hired. These changes have not been greeted warmly by the community.

> "The pub is no longer for locals, its just for tourists."
>
> "The wine and dine used to be a lovely thing, we could take the children and it was a good chance to get to know everyone."

6.3.4 The Churches

Although, according to the respective ministers, Hari Hari has a large population of church goers, very few people commented on their involvement with the church.

6.3.5 Gardening

The lack of trees and flowers in the township suggests that few people are interested in gardening. Only two people of all the town folk, mentioned gardening as a hobby. In contrast, most people have small vegetable gardens.

6.3.6 Activities Associated with Children

Activities associated with the school and the play centre are important mediums, through which many women rely upon to meet other members of the community. For those who do not have children, of which there are few, most felt left out, and believed that not having children made it more difficult to meet people, as children provide a common interest for the women.

> "All the women talk about their children and I do not have any."
>
> "If I had kids I would get to know more people."

6.3.7 Hunting and Tramping

The bush as a place for recreation is not important to many people in Hari Hari. Only a few adults mentioned they go hunting and tramping, and these tend to be Forest Service employees.

Tramping, hunting and camping was the fourth most popular activity mentioned by the High School students. Of the 23 students interviewed, 11 mentioned these activities. These were mostly males; very few females make use of the bush at their doorstep.

Some of the parents considered that it was sad that the school does not encourage children to go tramping.

> "There used to be a teacher who was keen on tramping and was always taking trips into the bush, but now there is no one."

The mountain safety club in Hari Hari organise tramping trips occasionally, but the club is not very active as

there are few interested and qualified people willing to organise trips.

6.3.8 Other Activities for High School Students

Sport was the most popular activity mentioned by the students interviewed, followed by horse riding for females and motorbike riding for males. Bike rides, fishing and watching television received only a few comments.

Some students commented that there was not enough night life for teenagers. These students mentioned their desire for a picture theatre. The idea that an outdoor pursuits centre should be established in Hari Hari was suggested by two students.

6.3.9 White Baiting

White baiting is a popular pastime for most people in Hari Hari. During the white bait season Hari Hari "buzzes" with activity. For most people it is the most exciting time of the year.

> "A good whitebait run, or a big catch really makes Hari Hari buzz with excitement."

The Hari Hari community expressed a feeling of resentment to the number of outsiders who come to Hari Hari, catch all the white bait, depriving the community and contributed nothing in return.

> "They even bring all their provisions with them."

6.4 COMMUNITY VALUES

As defined above, community values are those aspects of Hari Hari which are regarded by the community as being significant to their way of life.

Much information, giving rise to ideas concerning the future of Hari Hari, its social conditions, and employment opportunities can be gleaned from an understanding of community values.

6.4.1 Whence from, and why.

The reasons for coming to Hari Hari differ according to each employment sector.

i. The Farmers

The greatest proportion of farmers have come from outside the West Coast, only a few were born in the district and have since taken over their parents' farms or have bought land in the district. The main reasons for coming to Hari Hari were -

a. Parents farm or parents in the district.
b. Always wanted to farm on the West Coast and land was available in Hari Hari.
c. A chance to get onto some cheap land.

Those who had always wanted to farm on the West Coast sited the West Coast life-style as being the major reason. This was defined as; "A place where time does not really matter and where everybody is friendly and lets you do your own thing."

Some of the dairy farmers who sited cheap land as a reason, buy farms in Hari Hari with the intent of making money quickly, by developing the land and then selling. These are predominantly North Island farmers.

The decision to farm in Hari Hari in most instances was made by both husband and wife.

ii. Forest Service Population

The greatest proportion of people come from the North Island and have been employed for less than four years. Many of these people are single and stay only a few months or a few years.

Table 19 shows the origins and length of time employed for the total Forest Service employees.

Most of the Forest Service employees who come from Hari Hari are school leavers.

In general the Forest Service employees are relatively transient.

The reasons for coming to Hari Hari included:

a. Job availability/job experience;
b. job promotion; and,
c. a good place to save.

TABLE 19 TOTAL FORESTRY EMPLOYEES, ORIGIN AND LENGTH OF TIME EMPLOYED IN CURRENT EMPLOYMENT

Place at last employment	Less than 4 years	4-10 Years	Greater than 10 years
Hari Hari	5	2	1
West Coast	2	3	3
South Island	3	2	2
North Island	7	3	-
Totals	17	10	6

TABLE 20 TOTAL SAWMILL EMPLOYEES - PLACE OF LAST EMPLOYMENT AND LENGTH OF TIME EMPLOYED IN CURRENT EMPLOYMENT

Place of last Employment	Less than 4 years	4-10 Years	Greater than 10 yrs.
Hari Hari	2	1	-
West Coast	2	5	7
South Island	-	1	1
North Island	1	-	-
Other	-	1	-
Totals	5	8	8

iii. The Saw Mill Population

This sample included people from other West Coast areas, South Island and the North Island. Table 20 indicates the origin and length of time employed for all the sawmill employees.

The majority of this population are married and have lived in Hari Hari between four and ten years.

The reasons for coming to Hari Hari included:

a. Job opportunity and like the West Coast; and,

b. Job opportunity and good place to save;

For many, the job opportunities arose as a result of previous contacts with the mill, either through friends or as a result of being originally employed as a contractor to build the Mill. Each person took the job realising that it would not last forever.

iv. Government Department Population

The majority of these people have come from outside the West Coast and have been in Hari Hari for less than ten years, (Tables 21, 22, 23); of those people who have come to Hari Hari from the West Coast, most have come from South Westland. In the case of the Ministry of Works, several have come from Haast, following the closure of Carters Mill.

The most common reasons for coming to Hari Hari were:

a. Job and like the West Coast;

b. job promotion; and,

c. availability of work.

TOTAL GOVERNMENT DEPARTMENT EMPLOYEES PLACE OF LAST EMPLOYMENT AND LENGTH OF TIME EMPLOYED IN CURRENT EMPLOYMENT

TABLE 21 MINISTRY OF WORKS EMPLOYEES

Place of last Employment	Less than 4 Years	4-10 Years	Greater than 10 years	Totals
Hari Hari	2	1	2	5
West Coast	5	2	1	8
South Island	2	1	4	7
North Island	-	-	-	-
Totals	9	4	7	20

TABLE 22 POWER BOARD EMPLOYEES

Hari Hari	3	-	-	3
West Coast	1	-	2	3
South Island	-	-	1	1
North Island	-	1	-	1
Other	1	-	-	1
Totals	5	1	3	9

TABLE 23 SOUTH WESTLAND AREA SCHOOL TEACHING STAFF

Hari Hari	-	-	-	-
West Coast	1	1	1	3
South Island	4	2	3	9
North Island	1	1	-	2
Australia	5	-	-	5
Totals	11	4	4	19

v. Business Population

Most of these people have been associated with the West Coast or Hari Hari for a long time. Others have come from outside the West Coast. The majority of the business population has lived in the district for more than ten years.

The most common reasons for coming to Hari Hari were;

a. Parents lived in Hari Hari or on the West Coast;
b. enjoy the isolation and the landscape;
c. good opportunity for opening a business, and like the West Coast; and,
d. availability of resources.

vi. Home Business People

The majority of these people have come to Hari Hari, some from elsewhere on the West Coast, and others from elsewhere in New Zealand. Only a few of the women have lived in Hari Hari all their lives.

The most common reason for coming to Hari Hari was a result of their husbands getting a job in Hari Hari, and together they decided to settle in Hari Hari. However, in some instances, some are in Hari Hari because their husbands, in the business of job promotion, were required to come to Hari Hari.

6.4.2 Community Size

The small size of the community was raised by all those interviewed. The smallness and isolation of the community

are the features which people either most enjoy or dislike about living in Hari Hari. Different sectors of the population perceived the value of the small community in a variety of ways.

The majority of the farming population commented favourably on the peacefulness and friendliness of the community.

> "We love it here, away from the hustle of the city. Here time is our own, South Westland time."
>
> "Everyone knows everyone pretty well and accepts them for what they are."
>
> "People here are always willing to help out."

Only a few of the farming population commented that they found Hari Hari too quiet.

Of the 23 high school students interviewed, 13 stated that they enjoyed living in Hari Hari because it was a peaceful friendly community.

> "Here all the girls and boys are all together as one big family, its a kind of open house, you can go anywhere to visit people."
>
> "The community is involved in many things, making a would-be isolated place interesting."

Of the 56 townfolk interviewed, 31 people (56%) mentioned that they enjoyed the peace and quiet of Hari Hari. Most of these people were from the business population, some from the Government Department population and a few from the Forest Service and mill populations.

Their reasons for enjoying Hari Hari included:

a. Its peacefulness;

b. its friendliness; and,

c. its security.

Some of these people mentioned that they feel safe in Hari Hari.

> "We would sooner live in a small community in which everyone knows everyone's business rather than live in a city where you can not go out alone at night or leave your children at home for fear of being raped."

> "We are glad we came here, there are not many communities where you can leave the keys in the car."

The remaining 25 people (44%) commented that Hari Hari was too small, in that there was too much gossip, and too little to do. These people also commented upon the isolation of Hari Hari. The majority of these people were from the Forest Service and mill populations.

An integral part of nearly all small communities is the amount of gossip. The majority of the townfolk raised this point. It appears that gossip is accepted by most people as being inevitable and not really a bad thing.

> "There is good things and bad things, people usually know if you sneeze."

One person smiled wryly as he said:

> "Its a 'bugger' of a place for gossip though."

However not everyone enjoys gossip, indeed some people remarked that gossip is one of the worst aspects of Hari Hari. The majority of these people were from the

Forestry Village where, as a result of its isolation from the rest of the community, gossip is perhaps more rife.

> "There is too much gossip, people are always bickering."

There is one good thing about gossip, at least everyone knows if some one is sick. This was commented upon by the majority of people from the Forestry Village.

> "The only thing that is good is that everybody is very concerned about each other's well-being especially if someone wants something or is sick."

Gossip does not appeal to all the high school students.

> "Everybody is so nosey. You cannot get away with anything."

6.4.3 Isolation

Isolation from larger centres such as Greymouth and for some people Christchurch, was considered a major disadvantage of living in Hari Hari by 34 people. The majority of these people were from the Forest Service, Mill and Government Department populations.
Their reasons for disliking the isolation of Hari Hari included:

1. Lack of opportunity to go out for dinner, to the picture theatre, plays and music concerts;
2. Lack of nearby shopping facilities. Specifically mentioned were chemist, clothing and butchers shops;
3. isolation from families and friends; and,
4. the distance from a large centre where job opportunities were available for school leavers.

Some of the high school students mentioned that distance from other centres was a problem. However, most whilst mentioning isolation as a disadvantage, considered that it is also an advantage for it means Hari Hari is a quiet community.

Although the majority of comments concerning isolation referred to isolation from shopping centres and cultural activities, some referred to the isolation from nearby rural communities. The 15 people who raised this factor stated that they did not know people living in Whataroa,44 kilometeres south of Hari Hari and Ross, 44 kilometeres north of Hari Hari.

One person commented·

> "We once had a party and invited people from Whataroa and Hari Hari, but it did not work. Those from Whataroa stayed on one side of the room and people from Hari Hari on the other."

The lack of contact between neighbouring communities was attributed to:

1. Since 1978 the once regular sporting contacts between rural communities has declined due to the increasing cost of travel; and,
2. the steep drive over Mt. Hercules deters people from travelling to Whataroa.

6.4.4 Hari Hari:- a Good Place for Children.

The belief that Hari Hari is a good place in which to bring up young children was mentioned by 73 people.

Parents have few worries about the safety of their children and can let them wander off to play with neighbours without being concerned.

"Everyone knows who belongs to who."

It was commented by some people that in Hari Hari you are not left to bring up children on your own, everyone helps.

> "If you notice children misbehaving, even if they are not yours, you can still administer punishment, and then tell their parents."

While this was regarded by most as being a good thing, some people regarded it as an intrusion into their lives and found they were often rescuing their children from punishment.

Of the high school students interviewed, 8 made reference to the good community spirit. However, some considered that other people interfered with their lives too much.

"Everyone knows who has done what."

Although Hari Hari is widely regarded as an ideal place for young children, it is not thought to be such a good place for teenagers. Most parents (55) expressed concern that there was little entertainment for teenagers except the Hotel and occasional discos.

In contrast only 8 students mentioned the need for more night-time entertainment. One student who considered that Hari Hari has little to offer teenagers, wrote on his questionnaire:

"Ps. Hari Hari is a hole."

6.4.5 Community Trends

Many of the people who have lived in Hari Hari for more than ten years, believe that in this time the community has changed for the worst.

A different social pattern has emerged and many of the families who have been in the district for a long time have left.

> "We do not seem to have as good a social life as before. Now there seems to be different social types who prefer to join church groups rather than go out drinking."

> "People do not seem to participate in community activities as much as they used to. Once you would go to a function and meet the whole district there, but that does not happen now."

Community activities have also changed. In the past, emphasis was upon community picnics, horse races, square dancing and drama. However, as the people who organised these events have left, interest has declined and new people with different interests have introduced other activities. Today the emphasis is upon sport.

> "When we first came here (twelve years ago) there were a lot of social events, square dancing, and a drama group who put on a concert once a year, but now there is nothing."

This suggests that the social life of the community is determined by those individuals who are willing to generate enthusiasm and organise activities. Although many people criticised the lack of cultural events, no-one indicated that they were prepared to initiate such activities.

6.4.6 Scenery (Plate 30)

The majority of people (79) appreciate the surrounding bush-clad hills and mountains.

> "When it is fine there is no place on earth like Hari Hari."

The expanse of bush, for most people, was the feature of South Westland that most distinguished it from the rest of New Zealand. It was frequently commented that;

> "Once we come to Lake Ianthe and see all the bush, we know we are back in South Westland."

Living close to the bush and mountains was given as a reason for enjoying living in Hari Hari by 10 of the 23 students interviewed.

In contrast a few people indicated that they take the scenery for granted and that, after having lived in Hari Hari for a while, they no longer notice it.

One person commented;

> "We are here to make money not to enjoy the scenery."

6.4.7 The Climate

The West Coast is renowned for the amount of rain that falls. I found that many of the comments concerning the amount of rain in Hari Hari were made by those interviewed on wet days.

> "We are sick of the rain, the children grizzle all day long."

> "The constant rain makes you feel depressed after a while."

Plate 31. Looking towards Mt. Adams from Mt. Hercules.
(Photo, Sue Maturin)

On fine days there were fewer comments about the rain, instead people commented on how beautiful it is when it is fine.

One person when asked what stimulates the community commented;

> "A fine day makes everybody smile."

6.4.8 The South Westland Area School

The importance of the school to the community was mentioned by 50 people. The building of the school in Hari Hari has meant that families, who once would have moved away when their children reached high school are now more inclined to stay on.

While most people regard the school as being of a high academic standard, 30 people mentioned that the school should offer courses in agriculture, animal husbandry and forestry. It is believed that such courses would encourage more school leavers to stay in Hari Hari.

There is widespread belief amongst the community that as the Government has built the school in Hari Hari, the Government will provide employment to maintain the population at its present level.

> "The school must mean that something is going to be done for South Westland."

Some of the farmers send their children to boarding schools in Greymouth and Christchurch. They believe that their children should be given a chance to broaden their experience, beyond that of the West Coast. It is

also believed that children educated away from the West Coast have a greater chance of entering a career.

> "Children need competition, and there is not enough at the Area School."

One teacher remarked:

> "The children here do not realise what a competitive world they will be entering when they leave school."

6.4.9 Night Classes

Night classes for woodwork, dressmaking and typing were run by school teachers when the school first opened. These were attended by an average of ten people. However, these classes ceased when the teachers responsible for organising them left. Today only pottery classes are available.

The majority of the women when asked if they would like more night classes, replied that they would. But very few were able to suggest the kind of classes that would interest them. A few people suggested music, spinning and dying, and cooking classes.

Although individuals expressed an interest in night classes, no one had approached other people in an effort to stimulate community interest.

It was suggested by a teacher that if there was a demand for night classes then it might be possible to run particular courses, depending on the availability of

instructors. However the school has not been approached by the community, thus it is assumed that there is no demand.

> "People are willing to criticise but very few people show initiative and are prepared to organise something."

Adults are welcome to go back to school to attend academic classes during the day, whilst a few women take advantage of this opportunity, most do not. Some women in the township said they would go if they could, but they considered themselves tied by young children.

6.4.10 Services

The majority of people regard the health and banking services in Hari Hari as excellent, but transport and shopping facilities as non-existent.

Many people regard the local store as being unnecessarily expensive, and although they would like to support local businesses, they can not afford to as it is cheaper to buy groceries in bulk in Hokitika.

Some people also expressed dissatisfaction with the quality of work provided by the local garage, and preferred to take their vehicles to Greymouth or Ross for major repairs.

The New Zealand Road Services provide a regular passenger and freight service between Hari Hari and Hokitika. However few local people use the service as it only allows ninety minutes for shopping in Hokitika.

6.4.11 Community Future

Interviewees were asked to comment on their future plans and their expectations of the future for Hari Hari.

6.4.12 Future Plans

Of the farmers interviewed, the majority stated that they intended to stay indefinitely, similarly the business population.

Of the Mill population interviewed, four said that they planned to move within four years, three have already moved, and two said they planned to stay indefinitely whatever the future of their jobs.

Of the Forest Service people interviewed, three intend to stay indefinitely, and six plan to move within the next four years.

Similarly the Government Department population. The intent to stay was expressed by four people, and six indicated they planned to move within the next five years.

The decision of when to move for most people is dependent upon the age of their children. Those with pre-school age children intend to shift when their children start High School and those with high school age children will shift when the children leave school.

The reasons for wanting to move included:

1. Job opportunity for children;
2. job opportunity for the women once their children have finished school;
3. to be nearer to family and friends; and,
4. desire to live closer to a big centre where there is access to cultural activities.

6.4.13 When the Saw Mill Closes

The issue of the sawmill closing and its effect upon the community was raised by 60 people.

The majority of farmers believed that the closing of the mill would have little effect upon them. Most farmers do not rely upon the services provided by the Hari Hari community, such as the garage and the shops.

> "We do not have many services now so we would not miss them."

If the school were to decline in standard or to close, the children would be sent to boarding schools. While some were perturbed at this prospect, most expressed little concern.

Although most of the farmers' comments regarding the closure of the mill referred to the effect upon services, two mentioned the impact upon sports and three mentioned the impact upon the structure of the community.

> "It would be sad if the mill closed as with them the community is diverse. I would not like to live in a wholly farming community."

A few farmers considered that a population decline would be a good thing, because it would be a return to the "good old" days when the atmosphere was more personal.

In general, the farming population appear less concerned with the prospect of the mill closing than the townfolk. However, they would prefer the community to remain at its present size.

Of the 56 townfolk interviewed, 48 people raised the issue of the mill closing. The majority of these people believe that Hari Hari will "die" when the mill eventually closes unless alternative employment is provided.

They believe that the biggest effect will be a decline in the school roll which could mean that the standard of education will decline, or that the school will close. The school is an important feature of the Hari Hari community and they guard it jealously.

Some people mentioned that some of the sport and social clubs would become defunct due to lack of support.

One person commented that the church would suffer because the population would be too small to provide the necessary finance.

The women amongst the townfolk expressed the concern that if the mill closes and the population declines many would lose their jobs, which would make Hari Hari an undesirable place in which to live.

Whilst the majority of people do not want to see the population decline, neither do they want it to increase substantially. Only a few people remarked that it would be "great" if Hari Hari had a population of 2000 or more.

The general belief is that Hari Hari is a quiet community and any substantial increase in the population would destroy the community. A substantial increase was regarded as an increase of more than 200.

6.5 ALTERNATIVE EMPLOYMENT

In considering the options for future employment, the majority of people spoke of the need for local industries, believing that industries owned by outsiders, contribute little to the West Coast economy.

> "Any of the businesses that are here, most of the money is going outside of the Coast, for instance the mill and the pub, it would be good if there were some local industries."

The farming community suggested the following options:

a. Deer farming - a leather processing factory;

b. opossum farming;

c. bee keeping;

d. trout farming; and,

e. re-afforestation.

The townfolk emphasised the need for an industry which local people can identify with. The following suggestions were made:

a. Wood processing factory, furniture;

b. more jobs should be created around the Ministry of Works and the Forest Service;

c. the dairy factory should be reopened;

d. a game packing industry;and,

e. an out-door pursuit centre.

The majority of the townfolk considered their suggestions as being unobtainable for the following reasons;

> "West Coasters are generally difficult to get to invest,so any industry would be developed by an outsider and we have enough now without any more."
>
> "A furniture factory would not be viable, because the mill charge a flat rate for timber and high transport costs mean that we could not compete with areas closer to markets."
>
> "We have nothing here to attract businesses. Every time you lift the telephone you have to make a toll call."

6.5.1 Tourism

Most people believe that there is some potential for tourism in Hari Hari especially for the younger more active tourist.

The majority of people do not want tourism to become a highly organised commercial venture with "flash facilities" but believe that more effort could be made to encourage tourists to stay longer and "do their own thing."

The following suggestions were made:

a. Promotion of farm safari tours;

b. provision of farm motels;

c. local tours to show tourists, white baiting, farm, Mill and forestry work;

d. mini bus tours through the bush;

e. promotion of the La Fontaine stream for trout fishing. (The La Fontaine stream is world famous for trout);

f. provision of helicopter service for hunters;

g. rock hounding (many valuable stones are found along river beds in Hari Hari and further north.); and,

h. Promotion of easy bush walks to points of interest, for example, to the power house, to the Wanganui River mouth, and Mt. One One and to the Television tower on Mt. Hercules.

A few people believed that there is no potential for tourism in Hari Hari, due to uncertainty with the weather and they believe there is nothing in Hari Hari to interest tourists.

6.6 COMMUNITY ATTITUDES TO LAND USE

The way in which we perceive land determines what we expect to get from it. Land has both spiritual and practical values.

Molloy,(1980)p.7,noted "The use to which we put land is motivated by a complex misture of market forces, national necessity, individual desires, habits both good and bad, spiritual values, pragmatism and so on."

By asking people to comment upon agriculture, forestry and nature conservation as land uses, I sought to establish:

1. How individuals within the community perceives land and each land use;
2. what the community expects to get from the land; and,
3. what motivates individuals' desire for particular forms of land use.

It is not possible in this study to present the many differing individual attitudes to land use. It is, however, possible to present very generally the attitudes and desires expressed by the various employment populations.

Through the inclusion of individual quotes one can gain some idea of individual perceptions and desires.

6.6.1 Attitudes to Agriculture

The majority of interviewees raised few points about agriculture other than it being the "life blood" of Hari Hari.

It was suggested by one town person that;

> "All farm land which is marginally suitable for agriculture should be converted to forests and all forest land suitable for farming should be converted to agriculture."

A few farmers expressed concern of the future of their industry, believing that high transport costs will be the eventual ruin of farming in Hari Hari.

Agriculture as a land use is less controversial than either forestry or nature conservation. The majority of people, while recognising the importance of agriculture to the community, were more interested to express their views concerning forestry and nature conservation.

6.6.2 Forestry as a Land Use

Some of the people interviewed (20), declined to comment on forestry because they considered that they did not "know enough." The following issues were raised.

i. Replanting

The lack of replanting logged areas was mentioned by 53 people and was the most frequently raised issue. These people considered that the lack of replanting was one of the Forest Service's most serious mistakes.

> "The biggest tragedy is that for the last thirty years acres of bush has been cut but nothing has been replanted."

While the need for replanting is recognised, people are divided between planting exotics and natives. The majority of people (36) considered that exotics should be replanted as they grow faster than native species.

> "Any exotic that grows down here should be planted."

One person commented:

> "Pine plantations in Canterbury are on land which is highly valued for agricultural production and should be used as such. Land on the West Coast is good for growing trees and too expensive to develop agriculture, thus the West Coast should grow Pine Forests."

Only four people suggested that the Forest Service should concentrate on growing speciality timbers. These were farmers and Forest Service employees.

It was thought by 27 people that only native species should be planted as exotic species would look out of place in the Hari Hari district. Most of these people were from the farming community, a few from the business and Forest Service populations.

One person commented·

> "One thing that we have against the Forest Service is the amount of research they have done on native trees. They should have begun fifty years ago. Where native trees are regenerating they should be encouraged, where they are not they should be planted."

Some people (16) were undecided and believed that it mattered little which species were planted.

ii. Conversion to Farm Land

The belief that all logged areas which are suitable for farm land, should be converted to agriculture was mentioned by the majority of farmers. These people considered that the cost of developing such land would be beyond individual farmers, and should be undertaken by the Department of Lands and Survey. A few farmers believed that forested land should remain forested.

The majority of the town folk did not mention this issue. Of the 17 who did most were from the Forest Service and business populations.

One person commented;

> "Lands and Survey should concentrate on suitable areas in the state forests rather than on swamps.

iii. Selection Logging

Comments on selection logging were made by 38 people. Of these, 23 people considered that selection logging is not working due to - windthrow, ponding and the slow growth rate of rimu.

> "Selection logging is merely a political exercise keeping people who do not know happy."

> "I can not see how selection logging can work on trees that take 400 years to grow."

Of these, 11 people considered that logging should not continue into virgin areas. Instead, forests already modified should be logged more thoroughly.

> "If they have not found a system that works for over twelve years it seems pointless continuing."

The remaining twelve people believed that a small scale system of clear felling should be tried. One person suggested that helicopter logging would be the most appropriate method.

Most of the mill employees favour a return to clear felling.

Selection logging was thought by 15 people to be successful. Most of these people were from the farming, business and Government department populations.

> "Selection logging is better than clear felling - it does not ruin the land."

iv. End use of Rimu

Comments on wood processing were made by 28 people. All these people considered that an unnecessary amount of timber is wasted.

One sawmiller commented;

> "Not one stitch of it should be used for framing. Nobody can say now that we will get another crop, it's a oncer, so it should be used for decorative purposes."

One farmer believes·

> "We are plundering the native forests with a big percentage of waste, it is scandalous.

The majority of mill workers prefer to see rimu being used as much as possible for decorative purposes.

> "We get tired of being criticised for the amount of wastage, for we can not use all the log for decorative purposes. A proportion of it must be wasted or used for framing."

In contrast, it was said:

> "Last year 150 timber packs went rotten. Some of this was white pine which is supposed to be treated. But no one does a good job, so it rots quickly."

v. Size and Number of Sawmills.

The issue of the size and number of sawmills was raised by 23 people. The majority of these people thought one large mill would be better than the many small mills.

> "It would be better to shut the small mills and keep one mill going for twenty years rather than keep lots going for a short time."

On the other hand some people believed that small mills would be better than one large mill.

> "The trouble is with the big mills, they are owned by big outside companies, and they do not contribute much to the Coast. Small local mills would be better."

vi. Mill Closure

As mentioned in Section 6.4.13, the majority of people realise that the mill will inevitably close. The timing of the closure was mentioned by 27 people. Of these people 15 indicated that the mill should be kept going as long as possible but on a reduced cut.

> "The thing is they have to keep the mills going, but on the other hand they are cutting too much now."

> "I know the mills have to eventually close but they could last longer if the timber was not all shut up in reserves."

The belief that the mill should close as soon as possible was raised by 12 people. These people thought that too much emphasis was placed upon employment which could be overcome.

> "A patch of bush can be permanent but you cut that patch and it may employ twenty men for a little while but then it's gone."

vii. Timber Resource going Rotten

The belief that the bush is like any other crop, once it matures it should be harvested, was mentioned by 13 people.

> "When the trees reach maturity they need to be cut down because they are dying. They are wasted if they are left to die."

Note: The following Section, attitudes to nature conservation, gives a further indication of the community's attitude to the sawmilling industry.

6.6.3 Nature Conservation

All interviewees were asked to comment upon nature conservation as a landuse in Westland and their reasons for believing nature conservation, a good or a bad land use.

i. National Parks and Reserves

The issue of national parks and reserves was raised by 70 people. Of these, 45 people believed that there was enough land already locked up in national parks and reserves.

> "If they preserve any more there will not be another generation to see it."

> "If any more land is reserved they should compensate the people, then they may as well lock the whole coast up."

The reasons for believing this included:

a. National parks place too many restrictions on people's freedom, (14 people);

b. jobs are more important than trees, (10 people);

c. national parks prevent people from earning a livelihood, (6 people);

d. there is no need to preserve any more bush, it all looks the same to the tourists, (7 people); and,

e. national parks are only used by a few people, (8 people).

The belief that more areas should be added to reserves was mentioned by 17 people.

> "I believe it is important to conserve native bush because we need to maintain adequate forest that has not been touched so we can see our heritage."

The following reasons were cited:

a. There is a need to protect rare birds, (9 people);

b. national parks are all mountains - there is a need for lowland bush, (5 people); and,

c. there is a need to ensure that all types of forest are represented, (3 people);

The remaining eight people believed that a compromise must be reached.

> "There must be a compromise, some areas should be reserved, but we need both as a community."

ii. Rare Birds

The interviewees were asked to comment upon the need to protect rare birds. In response, 49 people indicated that it was important to protect rare birds, if it could be proved that logging would affect them.

> "I would like to know that my children will see all the birds that we see today."

It was believed by 27 people that logging does not disturb birds, thus there is no need to protect them.

> "Birds do not seem to be disturbed by logging. The kiwis, they have lived here, been worked amongst, and are still here. Though I suppose that it is a poor attitude."

> "The white herons love machinery."

The idea that the birds can be shifted to areas that are already saved was suggested by four people.

Many of those who stated that they did not want any further areas reserved also stated that in cases where rare birds were endangered, their habitats should be preserved.

iii. Visible Areas

The belief that all areas visible from the road should not be logged, but any area not visible from the road should be logged was raised by 52 people.

> "What the tourists can not see does not matter."

Only two people said they did not value the scenery and suggested that it should all be logged.

iv. Conservationists

The issue of conservationists was raised by 40 people. All but four of these people considered that conservationists were a "menace".

> "They would be better off looking after old people or clearing up cemetries."

> "They have hopped on a band wagon, after they have ruined the city now they are jealous of the West Coast."

On the other hand one person commented:

> "Conservationists are not really a threat to the logging industry, they get a bit over-zealous. But they have got some good ideas and have made people stop and think which is a good thing."

v. Who Makes the Decisions

The belief that "outsiders" have too much to say in what happens on the West Coast was raised by sixteen people.

One person commented:

> "I believe that it is important to reserve some areas for scientific and ecological and recreational reasons but in whose opinion is it justified? The locals, who are familiar with the area but take it all for granted, or the people who come over here for holidays and think the place is beautiful and want large areas reserved? Unfortunately these are the people who have the most say."

However only two of these people stated that they took an active interest in planning.

6.6.4 Discussion

i. Perceptions of Land and Land Use

The majority of people believe that land has practical values and should primarily be used for productive purposes. A land use which yielded the greatest return in a short term was considered by the majority of people to be the best use of land.

The majority of people in criticising the Forest Service for not having begun replanting earlier, were concerned that the land was not being used for productive purposes. The view that land in Reserves and National Parks is a wasted resource is apparent, by the number of people who regard the West Coast as having enough land "locked up". The reasons for believing that this is so, suggest that the majority of people resent the loss of freedom to earn a living from this resource or use it in the manner which best suits them.

The concern that the timber resources were being wasted was also expressed. The majority of people believe that the full value of rimu as a decorative timber is not being reaped.

Although these people give priority to the productive uses of the land, they also recognise the scenic values of the native bush and whilst believing that any land not visible should be logged, they consider that land which is visible should be preserved.

Many of these people also recognise that the native bush provides valuable habitats for wildlife.

In cases where a rare bird is in danger of extinction if disturbed by logging, the majority of people believe that priority should be given to the protection of the bird.

The resentment towards outsiders, who interfere in land management decisions, and the National Parks Authority who prevent the locals from using the land in the manner which best suits them, suggests that these people consider the land belongs to them. Thus the West Coast is under no obligation to the rest of New Zealand.

A minority of residents believe we have now reached the time when the preservation of the remaining unmodified forests should be accorded priority over the productive values of the land. These people perceive land as having spiritual and practical values. In the words of Molloy,(Molloy et.al., 1980) these people believe that "not touching can be using." Thus land that is preserved is not regarded as a waste resource. For these people land offers long term values for recreation and a chance to ensure that future generations will not be deprived of their heritage.

Preservation of a diversity of forest types is also regarded by them as being important.

Many of these people consider that the use of the native forests for the short term benefits of timber production prejudices the long term benefits that would be gained by preserving the forests. Consequently those forests not yet modified by logging should be preserved.

Embodied in this, is a belief that land does not, as of right, belong to the present generation.

ii. What the Community Expects to get from the Land

The majority of people primarily expect land use to provide a source of employment and income.

Although most people recognise that the forest resource will only provide jobs in the short term and can not sustain the present employment levels in the long term, they believe the provision of jobs for as long as possible should be the prime objective of land use.

To the majority of sawmillers their job is the first consideration. No one mentioned the national necessity to supply native timbers to fulfil a demand.

The farmers expect the land not only to provide a source of income but also to provide a way of life. Only a few farmers mentioned that farmers have an obligation to use their land in the manner which ensures maximum production whilst maintaining the long term productivity of the land. Most farmers are more concerned to preserve their way of life and

do not regard it important to achieve the maximum production, possible from their land. (See Chaper 4).

The majority of people also expect to get enjoyment from the scenic qualities of the landscape.

A minority of people expect the land, in addition to supplying a source of income, to satisfy physical and spiritual needs.

Generally the community as a whole expect landuse to sustain the community for as long as possible. Only a minority of people, who expect to obtain spiritual and physical satisfaction from unmodified forests, believe these areas should not be used for productive purposes and that alternative employment must be created.

iii. Motivations for Land Use

There are two extremes apparent, the majority who are motivated by the need for employment and the need to maintain the community at its present level, and the minority who are motivated more by spiritual desires. In the middle there is a small number of people who are motivated both by community need, to support population and employment and by spiritual desires.

6.7 SUMMARY

i. Community Characteristics

The nature of employment has the following influences upon the social structure and activities of the Hari Hari community:

a. Determines the age structure of the community. Hari Hari is predominantly a population comprised of young families and single men;

b. Hari Hari is a male dominated community;
   - The men generally find their work more satisfying and enjoyable than the women. Most have come to Hari Hari for their jobs.
   - The women often have little choice of employment.
   - The hotel is a focal feature for men only. The women rely on sports and activities associated with their children to meet people

c. The physical nature of the employment opportunities in Hari Hari do not attract many school leavers;

d. Social groups are largely centered around the dominant male employment sectors;

e. Leisure activities revolve around physical activities; and,

f. The Forest Service and Mill populations are less inclined to participate in community affairs. Presumably because they are the most transient populations in Hari Hari.

Community values are summarised in Table 24, according to the issues raised.

The study of the social structure, community activities and values, identified the following needs of the Hari Hari community:

a. A greater range of choice of employment for women;
b. employment for school leavers;
c. maintenance of present community size;
d. maintenance of the present school, and standard of education;
e. maintenance of present community activities;
f. maintenance of present services and businesses;
g. more cultural activities;
h. more convenient transport time tables, and
i. preservation and enhancement of surrounding scenery.

ii. Attitudes to Land Use

Perceptions of land use were assessed.
It was found the majority of people primarily regard land as a resource to be used for productive purposes.

The majority of people are motivated by the need for employment and income.

Attitudes to land use are summarised in Table 25.

TABLE 24 SUMMARY - COMMUNITY VALUES

ISSUES RAISED

Issues	Number of People	% of total interviewed 82
Hari Hari a small community	82	100
Peaceful friendly community	53	65
Hari Hari community too small	29	35
Gossip	50	61
Too much gossip	12	15
Hari Hari is too isolated from large centres	34	42
Isolation from other rural districts	15	18
Hari Hari, a good place for young children	73	89
Hari Hari, not a good place for teenagers	55	67
Appreciation of surrounding scenery	79	96
Area school important to community	50	61
School should offer more practical courses	30	37
Plan to shift within five years	20	24
Intend to stay	62	76
Hari Hari will die when the saw mill closes	60	73
Personally affected little when the saw mill closes	20	24

TABLE 25. SUMMARY - ATTITUDES TO LAND USE

Issues	Number of People	% of Total Interviewed
AGRICULTURE		
Farming is the life blood of the community	75	91
FORESTRY		
Lack of replanting	53	65
Replant with exotics	36	44
Replant with speciality timbers	4	5
Replant with native species	27	33
Conversion of state forest land to agriculture	39	47
Selection logging	38	46
Selection logging does not work	23	28
Logging should not proceed to unmodified areas	11	13
Small scale clear felling should be tried	15	18
An unnecessary amount of timber is wasted	28	34
Size and number of saw mills on the West Coast	23	28
One large mill	16	19
Many small mills	7	8
Mill should be kept going as long as possible	15	18
Mill should close as soon as possible	12	15
The bush should be harvested when it matures	13	16

TABLE 25 (Continued)

NATURE CONSERVATION		
Enough land already locked up in National Parks	45	55
Further areas should be reserved	17	21
We need a compromise	8	10
Important to protect rare birds	49	60
Logging does not disturb birds	27	33
The birds can be shifted	4	5
Visible areas should not be logged	52	64
Conservationists are a menace	36	44
Outsiders have too much say in West Coast affairs	16	20

Chapter Seven

Future Land Use Options

7.0 INTRODUCTION

Chapter Three reviewed the knowledge gained from practical land use experience, in the past and in the present. These experiences, when combined with necessary scientific research, suggest viable options for future land use. Where either a basis of practical experience or a foundation of appropriate scientific knowledge is lacking, new or alternative patterns of land use face a possibility of failure. Such land use failures are accompanied by the possibility of a permanent loss of land values.

This chapter outlines a series of options and their social, economic and environmental implications for agriculture and production forestry. Two possible methods for selecting the most appropriate options are presented. The first emphasises short term social and economic criteria. The second emphasises ecological

criteria. All options are tested for their ability to meet each criterion.

7.1 OPTIONS FOR AGRICULTURE

The possible options for agriculture are not considered in detail due to lack of available information.

i. Option One. Continuing as at Present.

Agriculture in Hari Hari is limited to dairy and sheep and beef production. Alternatives such as deer and opossum farming, and bee keeping are presently being experimented with. Implications include:

a. Farm income will remain more or less at present levels;
b. district farm production will not greatly increase;
c. employment will not increase;
d. present landscape character will be maintained; and,
e. present life styles will be maintained.

ii. Option Two. Increasing Present Management Efficiency.

Section 4.1.3 noted that farm management efficiency could be improved by better pasture management and understanding of stock nutrition requirements. The small number of farmers who have achieved comparatively high productivity per animal,indicates that there are many farmers who could increase their productivity. This option has the following implications:

a. Land that is already in production would be used more intensively;
b. little capital expenditure is required to achieve an increased management efficiency;

c. More effort and time might be required than is presently spent to achieve current production levels;

d. Farm income and farm production would increase; and,

e. Extra employment might be created.

iii. Option Three. Developing Undeveloped Land.

Some 4,800 ha. assumed suitable for agriculture remains to be brought into production, (Section 4.1.2).

Implications include:

a. Incentive to use present developed land more intensively might be lessened, as farm size would be increased;

b. high capital inputs would be required;

c. time and labour would be required, which would subtract from time available to farm developed land more intensively;

d. if rationalisation of farm boundaries accompanied land development, it might be possible to increase the number of farm units;

e. farm income would increase;

f. extra farm labour might be required, thereby increasing the level of district employment;

g. modification of present landscape character; and,

h. suitability of the land for development has not been assessed.

iv. Option Four. Clear felling and Conversion of State Forest land, for Agricultural Production.

Implications include:

a. A large proportion of the State Forests are on Pakihi soils. The suitability of pakihi soils for agriculture in South Westland is not known; (Cutler, pers.comm.);

b. the impact upon the forest ecosystem, resulting from clear felling and conversion to farm land can not be assessed with present knowledge;

c. modification of present landscape character;

d. pakihi development involves considerable expense and "inputs" might exceed "outputs"; and,

e. labour would be required and more farms developed. This would increase district employment.

v. Option Five. Horticultural Production

Potential for horticulture on the West Coast has been assessed by Crowder et.al., (1978). This report recommended that Hari Hari would be suitable for production of Blueberry and Blackberry fruit. Implications include:

a. There is very little factual information regarding plant performance on the West Coast, and the risks involved in fruit production are not known;

b. research into and establishment of horticulture requires expertise which is not locally available;

c. initial capital expense would be high;

d. extra employment may be required;

e. land would be used more intensively than at present;

f. impacts upon the land ecosystem are unknown; and,

g. present life styles would be altered.

vi. Option Six. Other Agriculture Diversification. Deer farming and opossum farming are currently being tried, (Section 4.1.5). These may be viable alternatives to traditional farming. It is likely that possibilities exist for eel farming, freshwater crayfish farming and rabbit farming (Murray, pers.comm). Bee keeping could be expanded (Section 4.1.5). Implications include:

a. Introducing more diversity to agriculture;
b. land would be used more intensively than at present;
c. extra employment may be needed;
d. expertise may be required;
e. initial capital expense would be high;
f. the risks involved in these land practices are unknown; and,
g. present life styles would be altered.

7.2 OPTIONS FOR PRODUCTION FORESTRY

i. Option One. Continuing to log Remaining Virgin Areas (currently zoned for production), at Present Cutting Levels - for Ten Years.

This involves selection logging the remaining virgin terrace and hill forests within the study area at present cutting levels. The present cut is 60,800 m^3/annum.

It is estimated that the total millable volume available now from virgin terrace forests is 630,500 m^3, (Griffiths, pers.comm.).

This represents the entire 50 year allocation from the terrace rimu forests, were this to be cut on sustained yield principles.

Total volume available from hill forests (assuming total removal) is 191,000 m^3. (Griffiths, (pers.comm). Within this option there are various alternative ratios, between the level of cutting for terrace and hill forests.

a. Total removal of hill forests over 10 years;
b. Sustained yield of hill forests, would provide 10,000 m^3., (over 50 years).
c. No removal of hill forests.

The impact of these options upon sustained yield of terrace forests are seen in Table 26. For all three options, the level of cut exceeds total sustained yield from terrace forests over ten years.

The remaining volume after ten years for all three cutting ratios, is 200,500 m^3.. This would be enough to maintain the present level of cut for an additional 3.3 years. Thereafter there would be a gap of 37 years before there would be a millable resource from terrace forests. This assumes that a 50 year cutting cycle is adequate. This also assumes that there will be no relogging of previously logged strip areas, or salvage from selection logged areas.

TABLE 26 OPTION ONE. CONTINUING AS AT PRESENT:- ALTERNATIVE RATIOS FOR SUPPLY OF WOOD FROM HILL AND TERRACE FORESTS OVER TEN YEARS

	Total volume m^3	Volume removed m^3	Terrace sustained yield m^3	Volume taken in excess of sustained yield m^3	Total Volume remaining after 10 years m^3
a. Total Removal of Hill Forests.					
Hill	191,000	191,000			Nil
Terrace	630,500	417,000	32,000	385,000	200,500
Totals	821,500	608,000			200,500
b. Sustained yield from Hill Forests					
Hill	191,000	10,000			181,000
Terrace	630,500	600,000	32,000	568,000	30,000
Totals	821,500	608,000			200,500
c. No Logging of Hill Forests					
Hill	191,000	Nil			191,000
Terrace	630,500	608,000	32,000	576,000	22,000
Totals	821,500	608,000			200,500

Note: Sustained yield estimate was provided by Griffiths (pers.comm.).

There is an additional 30,000 m^3 available from previously logged strip areas. These are damaged areas, regarded by the Forest Service as being desirable to clear fell. If this resource was clear felled, the current industry could be maintained for an additional six months.

Some of the ecological, social and economic implications of this option include:

a. The total amount logged over ten years exceeds the estimated sustained yield from terrace forests, by 385,000 m^3. to 570,000 m^3. depending upon the ratio of cut between hill and terrace forests, (Table 26). This means that the forests will be severely depleted and the forest ecosystem severely modified. The extent of forest depletion is liable to be greater than the above estimate, as present logging systems result in further losses of timber volume from the remaining stands, (Section 4.2.3). The new logging proposals, (Section 4.2.6) hope to largely reduce the losses following logging. These methods have yet to be proved

b. The long term results upon the stability and productivity of the forest ecosystem are not known, (Section 4.2.8). They may be such that possibilities for any further production would be endangered.

c. The present sawmilling industry could be maintained for a maximum of 15 years, and thereafter there would

be no millable resource for 30-40 years, assuming that 50 year cutting cycles are correct.

d. Alternatively, if present sawmills were maintained for ten years, the remaining resource would be 221,500 m^3, which would provide one mill the size of the Hari Hari sawmill with 20,000 m^3/annum for 11 years. Thereafter there would be a period of 29 years before a substantial millable resource would be available. It should be noted that within 14 years it is possible that a small volume of timber will be available from previously logged areas in 1963-65.

e. Current legal commitments, which require a total of 445,733 m^3 will be exceeded. This is for the three sawmills drawing timber from within the study area, (Section 4.2.9).

f. Present employment levels will be maintained in the short term. There will be no disruption to the local, regional and national economies in the short term.

g. There will be no supply of decorative timber from the study area for 37 years after 1995 (c) or 29 Years for (d).

ii. Option Two. Reduction in Present Cutting Levels to Meet Existing Legal Commitments.

The current legal commitment to the sawmilling industry, (drawing timber from within the study area) is 445,733 m^3.

This runs over 8.9 years for Henderson and Pollard, 6.9 years for Colonial Sawmills and 8 years for Ruatapu, from 1.1.80, N.Z.Forest Service (1980).

The Forest Service in their management proposals for South Westland forests, (1980), propose an increase in sawlog allocations, to 535,920 m^3. The increase is the result of a recent Government decision to supply Ruatapu with an extra 30,000 m^3 per annum for 8 years. The new proposals allow Henderson and Pollard an option of operating for 5-10 years, Ruatapu ten years and Colonial 6-9 years.

Within this option there are alternative ratios between levels of terrace forest cut and levels of hill forest cut, (Table 27).

Under this option, and all three alternative ratios, the forests would continue to be over-cut by between 400,000 m^3 and 500,000 m^3 depending upon the ratio used.

The remaining volume of 290,600 m^3 after ten years logging, plus the 30,000 from strip logged areas, would supply the present industry for an additional 5-10 years, or alternatively supply one mill with 20,000 m^3/annum for 15.5 years, at which time a small volume of timber would become available from previously logged areas. But there would be a gap of 30-40 years before a substantial volume became available. It is doubtful

TABLE 27 OPTION TWO. REDUCTION IN CUT TO MEET LEGAL COMMITMENTS:- ALTERNATIVE RATIOS FOR SUPPLY OF WOOD FROM HILL AND TERRACE FORESTS OVER TEN YEARS

Total volume m^3		Volume removed m^3	Terrace sustained yield m^3	Volume taken in excess of sustained yield m^3	Total Volume remaining after 10 years m^3
a. Total Removal of Hill Forests.					
Hill	191,000	191,000			Nil
Terrace	630,500	344,900	32,000	312,900	285,580
Totals	821,500	535,920			285,580
b. Sustained yield from Hill Forests					
Hill	191,000	10,000			181,000
Terrace	630,500	525,920	32,000	490,900	104,580
Totals	821,500	535,920			285,580
c. No Logging of Hill Forests					
Hill	191,000	Nil			191,000
Terrace	630,500	535,920	32,000	500,900	94,580
Totals	821,500	535,920			285,580

Note: In addition to the above 30,000 m^3 could be available for clear felling from previously strip logged areas. This would slightly reduce the level of overcut of terrace forests.

if there would be enough timber coming on stream during the gap to maintain a viable industry.

iii. Option Three. Reduction of Permissable Cut to Level of Sustained Yield.

Estimated sustained yield from terrace virgin forests over 50 years is 3,200 m^3., per annum.

Total volume available from hill country is 191,000 m^3., assuming total removal. This volume may be spread over ten years, giving an annual yield of 19,100 or over 50 years giving an annual yield of 3,800 m^3. Alternatively, the hill forests could be logged at sustained yield levels, which would mean an annual yield of 1,000 m^3., or they could remain untouched.

By the year 2016 it is estimated that an additional sustained yield volume of 6,000 m^3/annum, (from previously selection logged areas), will come on stream.

Table 28 indicates a total yield of 7,020 m^3/annum., obtainable from hill forests and terrace forests, assuming total removal of hill forests over 50 years and sustained yield from terrace forests. This would sustain a mill the size of the old Houston mill at Hari Hari, which employed six people. If the hill forests were totally removed over 35 years, (when the additional terrace yield is estimated to come on stream) the annual yield would be 8,700 m^3/annum, increasing to 9,000 m^3 after 2016.

TABLE 28 OPTION THREE. REDUCTION TO SUSTAINED YIELD:- ALTERNATIVE RATIOS FOR SUPPLY OF WOOD FROM HILL AND TERRACE FORESTS, OVER 35 YEARS AND 50 YEARS 50 YEARS

Total volume m^3		Present sustained yield terraces m^3	Volume removed per annum	Annual yield there-after	Sustained yield terraces after 2016
a. Total Removal of Hill Forest over 35 years - year 2016					
Hill	191,000		5,457		
Terrace	630,000	3,200/annum.	3,200	9,000	9,000
Totals	821,000		8,657	9,000	9,000
b. Total Removal of Hill Forest over 50 years					
Hill	191,000		3,820	Nil	Nil
Terrace	630,500	3,200/annum.	3,200	3,200	9,000
Totals	821,500		7,020	3,200	9,000

Note: In addition to the above, there is 30,000 m^3 available from strip logged areas. If these were clear felled over 50 years, volume would increase to 7,600 m^3/annum. Alternatively, if these were logged over 35 years annual yield would increase to 9,514 m^3.

Implications of this option are:

a. Present logging systems are unsatisfactory and in the majority of cases, results indicate that loss of volume following logging exceeds natural annual increment, (Section 4.2.3). The proposed alternative method is unproven;

b. provides some flexibility for future management;

c. maintains options for activities such as honey production

d. total removal of hill country forests would destroy the forest ecosystem. No further yield would be obtained for possibly 500 years from these areas if left to regenerate. Planting nursery raised seedlings would reduce the time, (James, (pers.comm.);

e. the concept of sustained yield does not take into account all components of the forest ecosystem. The present estimated sustained yield involves annual removal of the volume equal to the annual natural increment. The impacts of this upon the long-term stability and productivity of the forest ecosystem are unknown;

f. current legal commitments would not be met. This would require either re-negotiation of the contracts or the purchase of cutting rights by Government, or supply of timber from elsewhere;

g. all but one mill would be forced to close, causing an immediate reduction in employment. Local and regional economies would be affected. The effect of this upon Hari Hari is discussed in Chapter 8 and

h. There would be a considerable reduction in the supply of timber to the national market. The implications of this can not be fully assessed. However, analysis of the 1972-73 end use survey, (N.Z.Forest Service,) indicates that 31% of all timber used in the building industry, is native, and of this only 10.5% was used for decorative purposes. Foley (1975), suggests that rimu has very few special uses in the building industry and in most instances can be replaced with either exotic or other alternatives. The furniture industry does not use substantial amounts of rimu. Particle board and veneers are preferred, (Nicholson, (pers.comm.) This suggests that the reduction in supply of rimu timber would not greatly affect the building or the furniture industry.

iv. Option Four. Establishment of an Exotic Resource on Clear Felled Areas.

Assuming that areas which have been previously clear felled, would be the most appropriate areas (depending upon their suitability), for an exotic resource, it is estimated that an area of 5,000 ha.is available.

Pinus radiata, on average for Westland, yields a merchantable volume of 430 m^3/ha.at age 30, (Reid, (pers.comm.). Assuming a 30 year rotation, it is estimated that 2,000 ha would be needed to maintain the present Hari Hari mill, (Reid, (pers.comm.).

If the 5,000 ha was planted, it would be possible to sustain two mills slightly larger than the present mill. This compares with an estimated 14,285 ha required of native forest to maintain the present mill on sustained yield principles. The feasibility of this option is dependent upon a number of unknowns:

a. Site suitability - refer to Section 4.4.1 and 4.4.2;
b. species suitability;
c. ability to compete in the market with exotics grown in other districts.

Implications of this option include:

a. Modification of the landscape character of the district;
b. effects of clear felling indigenous forests and replacement with exotics, upon the forest ecosystem is unknown;
c. log extraction could not begin until after the year 2000;
d. employment would be created immediately and a steady labour force would be required for silviculture; and,
e. once established, an exotic resource could maintain a stable timber industry indefinitely.

v. Option Five. Clear Felling of Some State Forest for Conversion to Agriculture.

Implications of this option for forest management are:

a. Immediate release of timber volume; and,

b. loss of option to manage forest resource in perpetuity.

Section 7.1 outlined further implications.

vi. Option Six. Immediate Cessation of Logging

If logging was to stop immediately it would have the following implications:

a. Allow time for appropriate research to adapt management systems to requirements of the forest ecosystem;

b. enable the impact of logging upon the forest ecosystem to be assessed and accounted for;

c. maintain options for the future, and allow possibility of long-term sustained use of the forest resource. This would ensure a continuing and stable industry in the long term;

d. closure of the sawmill in the short term;

e. reduction in employment. The effects of this upon Hari Hari will be assessed in the following chapter.

f. reduction in money flowing into the local and regional economies; and,

g. allow the possibility of establishment of locally-owned, small, more efficient mills in the long term, (Section 2.28). Locally-owned mills would contribute more to the local economies than the present large mills owned by outsiders. Efficiency in the small mills was achieved in part through skilled labour, the present large mills employ machines rather than people.

vii. Option Seven. Replanting Cutover Areas with Native Seedlings.

This is an option which could coincide with Options 1-3 and 6. This option includes the possibility of establishing native managed stands,which essentially means an artificial plantation. With silvicultural tending, annual growth rates of rimu could be increased, to shorten the rotation length required in naturally regenerated stands. Thinnings could be used for posts.

Implications of this option include:

a. Modification of natural landscape;

b. the feasibility of extensive replanting, and its impact upon the forest ecosystem is not known;

c. employment would be created; and,

d. a nursery would probably be required.

7.3 METHOD FOR DETERMINING APPROPRIATE OPTIONS

The decision of which option is most appropriate depends upon the criterion chosen for selecting the option or options.

Broadly, there are two criteria, one which emphasises economic and social needs, and one which emphasises ecological requirements.

i. Social and Economic Criterion

This assumes that priority is given to options which fulfil immediate social and economic requirements. For the Hari Hari district these include maintaining or increasing the level of employment and the viability

of the economy, thereby ensuring minimum social disruption. For the individual farmer and sawmill owner, these include options which provide maximum economic return in the short term. The satisfaction of short term social and economic goals may conflict with long term goals.

ii. Environmental Criterion

The environmental criterion is based upon ecological principles which provide for long term social and economic goals. Such an approach is convincingly argued for land use in New Zealand by Molloy et.al., (1980). Molloy identifies the following six maxims;

" LAND USE IS ECOSYSTEM MANAGEMENT

An understanding of the functioning of ecosystems is fundamental to sustained use of them and the resources they contain.

LAND USE IS STABILITY

Stable is not necessarily static; planning must be based not on the average event but also on a calculated probability of extreme events. Risks must be quantified. Land uses should be able to withstand shocks either through built in resilience, or inherent diversity, or by a mosaic of compatible uses.

LAND USE IS COUNTING THE COST

The "point of diminishing returns" is particularly appropriate to land use planning. There is little

point in squeezing out the last kilogram or megajoule of production if the input to achieve it is greater. Land use should be based on net not gross returns, taking into account all visible factors such as environmental impacts.

LAND USE IS BEAUTIFUL

Land not only produces commodities but it should also be a source of recreation and inspiration. Beauty in the landscape is a product of diversity, not uniformity; it is a blend of the natural and the cultural protection and production should go hand in hand.

LAND USE IS CHARACTER

Whether in town or country, our landscapes should be distinctively and recognisably New Zealand in character, and hence a cause for pride.

LAND USE IS FOREVER

Land is a resource to be cherished and enhanced. Planned land use would produce a sustained yield of clean air and water and other renewable resources plus a considerate use of finite materials. Land should be passed onto the next generation in better condition than it was when we inherited it."

(Molloy, et.al., 1980, p.9)

7.4 APPROPRIATE OPTIONS FOR AGRICULTURE

i. According to the social and economic criterion. Options which clearly have social advantages are those which offer possibilities of increased employment. These are:

a. Option two; Increasing present management efficiency;
b. option three; Land development;
c. option five; Horticultural production; and,
d. option six; Other agricultural diversification.

These options, if undertaken by present farmers, would involve a change of life style, which may be unacceptable to those involved. Option one, continuing as at present, whilst maintaining present life styles, does not contribute to increasing employment.

Options which have economic advantages, can be divided into those which have immediate economic benefits, and those which would achieve economic benefits in the longer-term. Options meeting the former criteria include;

a. Option two; Increasing present management efficiency.

Options conforming to the latter criteria include:

a. Option three; Land development;
b. option four; Agricultural development of State Forest land (this is questionable);
c. option five; Horticultural production; and,
d. option six; Other agricultural diversification.

ii. According to ecological criterion:

Options which have ecological advantages are:

a. Option one; Continuing as at present;

b. option two; Increasing present management efficiency; and,

c. option six; Deer farming, opossum farming and bee keeping only.

These options are based on ecosystem management; they have minimal environmental risks; they provide for diversity; they maintain present landscape character and enable the land to be passed on to the next generation, in better condition than when we inherited it.

The most appropriate options are those which fulfil all three; social, economic and ecological, criteria. These are:

a. Option one; Continuing as at present;

b. option two; Increasing present management efficiency; and,

c. option six; Deer farming, opossum farming and bee keeping only.

It is possible that once appropriate research into suitability of land for development and horticultural production, and the environmental effects and risks of other farming types (in particular eel farming and fresh water crayfish farming) has been achieved, all six options might be appropriate. Research concerning these options should begin immediately.

7.5 APPROPRIATE OPTIONS FOR PRODUCTION FORESTRY

i. According to Social and Economic Criterion.

Options which have social and economic advantages are those which maintain employment and provide maximum economic return in the short term. These include:

a. Option one; Continuing as at present;
b. option two; Reduction of present cut to meet existing legal commitments;
c. option four; Establishment of an exotic resource; and,
d. option seven; Replanting cutover areas with native seedlings.

Options four and seven could coincide with options one and two. If they did not occur simultaneously with either of these options, they would not fulfil the economic criteria for the mill owners.

These options have severe implications for the possibility of a long term sustained yield of indigenous timber. Option three, while causing an immediate impact upon local, regional and national economies, would allow the possibility of maintaining a small timber industry in the future.

Options for future generations' use or non-use would be foreclosed. In the case of option four this would apply only to the converted area.

The stability of the forest ecosystem may be irreparably damaged. The impacts of these options upon the forest ecosystem are not known.

As Molloy et.al., (1980 p.9) states:

> "Managing without knowing all the rules lays us open to risk. Every organism lives with risk, but man should be able to ensure that his own activities do not add to the hazards or foreclose future options that are belatedly recognised."

ii. According to An Ecological Criterion.

If the ecological criterion is accepted, option 6; immediate cessation of logging, is the most appropriate. Option six does not meet the social and economic criterion. The other options (1-6) do not meet the environmental criterion for the following reasons:

a. The functioning of forest ecosystems is not understood, (Section 4.2.8).

b. the risks of logging and establishment of exotic plantations and agricultural practices upon the the forest ecosystems can not be quantified, with present knowledge, (Section 4.2.8).

c. the large scale depletion of forests under options 1, and 2 would destroy the beauty of the landscape. It is hoped that the alternative proposals of small scale clear fellings, accompanied by replanting, and greater attention to tidiness will overcome some of the visual disamenities caused by current logging methods (James, 1980).

d. options 1, 2 and 5 do not enable the sustained use of indigenous forests. A logging system which achieves sustained yield in all situations has not been devised; and,

e. the forest ecosystem will not be passed on to the next generation in better condition than it was when we inherited it.

Molloy et.al.(1980, p8) suggests that the wisest way to use land is to "Design with Nature."

> "This simply says that in the long run, defining natural constraints and working within them is the wisest and certainly the most economical way of doing things."

The implication of this is that wise forest management requires identification of the natural constraints, and design of logging methods to work within them. until such time as this is achieved, production logging should not proceed. This option offers the best scope for ensuring stability and sustained production from the forest ecosystem, maintaining environmental quality and maintaining options for future generations. An ecological approach to land use planning is also wise social and economic planning, because it allows the possibility of sustained production.

7.6 SUMMARY

i. A series of options were outlined, together with their social, economic and ecological implications. This was done for both agriculture and production forestry.

These options were:

Agricultural options:

a. Option one: Continuing as at present;
b. Option two: Increasing present management efficiency;
c. Option three: Developing undeveloped land;
d. Option four: Clear felling and conversion of State Forest land for agricultural production;
e. Option five: Horticultural production; and,
f. Option six: Other agricultural diversification.

Production Forestry Options:

a. Option one: Continuing to log Remaining Virgin areas (zoned for production) at present cutting levels, for ten years;
b. Option two: Reduction in present cutting levels to meet existing legal commitments;
c. Option three: Reduction of permissable cut to level of sustained yield;
d. Option four: Establishment of an Exotic Resource on clear felled areas;
e. Option five: Clear felling of some State Forest land for farm land;
f. Option six: Immediate cessation of logging; and,
g. Option seven: Replanting cut over areas with native seedlings.

ii. Social and economic criteria and ecological criteria were used to determine the most appropriate options.

iii. For agriculture, the following options were considered most appropriate:

a. Option one: Continuing as at present;
b. Option two: Increasing present management efficiency;
c. Option six: Deer farming, opossum farming and bee keeping only.

iv. For production forestry the most appropriate option is;

Option six: Immediate cessation of production logging until the natural constraints are identified, and a logging system is designed to work within these constraints.

This option does not meet immediate social and economic requirements.

It conflicts with the wishes of the majority of Hari Hari people, who believe that logging should continue, (Section 6.8.2). The analysis of their perceptions to land use, (Section 6.8.4) found that the majority of people have little understanding of the ecological principles of sound land use, and believe that appropriate land use should fulfil immediate social,

and economic needs. This belief is based on the idea that if logging does not continue, Hari Hari will "die" (Section 6.4.13). This assumption which is a critical component of any decision involving West Coast land use, is tested in the following chapter.

Chapter Eight

Impact of the Sawmill Closing Upon Hari Hari and Alternatives for the Future

8.0 INTRODUCTION

The previous chapter suggested that an important option for forest management in the Hari Hari area is the immediate cessation of logging. The people of Hari Hari believe that this option would destroy their community.

This chapter investigates possible impacts of the sawmill closing upon Hari Hari, and opportunities for alternative employment. Background information to this chapter is provided by chapters five and six.

The closure of the sawmill is not expected to affect Forest Service employment. Although the jobs directly associated with the sawmilling industry will be lost, they will be replaced by employment in research, planting and silvicultural tending(Reid, (pers.comm.).

8.1 IMPACT UPON EMPLOYMENT

Closure of the sawmill will cause the direct loss to Hari Hari, of 21 jobs. Indirectly, five full-time jobs and three part-time jobs will be lost. Two of the full-time jobs will be replaced by two part-time jobs, (Table 29).

8.2 IMPACT UPON POPULATION

Closure of the sawmill will directly affect 63 people, (Section 5.4.4). However, as indicated in Section 7.4.12 not all the sawmillers intend to shift. These families account for approximately ten people. It is probable that indirect loss of employment will account for an additional five people.

Total expected population loss is 58 people, (this includes adults and children).

8.3 ECONOMIC IMPACT

The percentage of income provided by the sawmill population to each business and service is indicated in Section 6.4.6, Table 13. From this it can be seen that businesses and services likely to be most affected (i.e. loss of more than 20% of their income) by loss of the sawmill population are:

a. T.A.B.;

b. trans West transport firm;

c. Hotel bar; and,

d. Health clinic.

TABLE 29 FULL-TIME AND PART-TIME JOBS INDIRECTLY LOST AS A RESULT OF THE SAWMILL CLOSING

Activity	No.Full-time	No.Part-time
General Store	2	2
Trans West	1	-
T.A.B.		1
South Westland Area School	2 replaced by two part-time	
Totals	5	3

Services and businesses significantly affected, (loss of more than 15%), will be:

a. Arnold Transport;

b. South Westland Savings Bank; and,

c. the Area School.

The degree of effect upon each business and service is dependent upon their current viability. The effects are summarised as follows:

i. T.A.B; - reduction in operating hours;

ii. Trans West Transport; - the number of trucks operating from Hari Hari will be reduced from five to four;

iii. hotel bar; - no effect;

iv. health Clinic; - reduction in hours of operation - both district nurse and doctor. The service will not close;

v. Arnold Transport; - no effect;

vi. South Westland Savings Bank; - reduction in hours of operation;

vii. Area School (Table 30) indicates that there are thirty-seven sawmillers' children at school. Of these pupils, twenty-six come from Hari Hari, and eleven from Whataroa and Pukekura. If the school roll decreases to 205 pupils, the school loses one full-time senior teacher and one full-time junior teacher, and if the roll further decreases to 179 one more full-time teacher would be lost. However, these positions would be replaced by part-time teachers. Should all three mills close this year

TABLE 30 SOUTH WESTLAND AREA SCHOOL ROLL - FEBRUARY 1980

Class	Farmers	Forestry	Mill Workers	Govt. Dept.	Employed by or own Business	Others
Lower infants	6	2	-	2	2	1
Upper infants & Juniors	35	5	12	9	9	9
Form one & two	19	7	3	4	1	1
		HIGH SCHOOL				
3rd-4th Form	28	3	13	7	3	1
Form 5	13	-	7	-	3	2
Form 6	6	1	1	2	-	-
Form 7	1	-	1	-	-	-
Totals	108	18	37	24	18	14
% of total 219	49.3%	8.2%	16.9%	11.0%	8.2%	6.4%

Source: School Principal.

the school roll will decline to 182, and cause the loss of two full-time teachers.

viii. general Store;- reduction in goods carried or possible closure;

ix. tearooms;- insignificant;

x. garage;- insignificant; and,

xi. post Office;- insignificant.

Note: Data was obtained from the manager/owner of each business and service.

Although a number of services and businesses will be affected, and to some extent reduced, only one business is likely to be lost following the closure of the sawmill.

Closure of the general store will have little impact upon the community as most people purchase bulk groceries in Hokitika and obtain only daily necessities from the local store. These are also provided by the tea rooms.

The reduction in services and businesses will be an inconvenience to most local people. However, it is unlikely that these will cause a further population loss.

8.4 IMPACT ON COMMUNITY ACTIVITIES

Table 18, Section 6.3.2 indicates that the sawmill population provides little support to most community activities. Therefore, the loss of mill population

will have a minimal effect upon community activities.

8.5 ALTERNATIVE EMPLOYMENT

8.5.1 Aims of Alternative Employment:

a. To alleviate future unemployment resulting from closure of the sawmill;
b. to create a diversity of employment opportunities, which provide employment for women, men and school leavers;
c. to create employment activities which are partly or wholly owned by people living in Hari Hari;
d. to produce high value, low bulk, high quality distinctive items, which do not attempt to compete with mass produced products, and which do not necessitate large capital investment;
e. to create small scale labour-intensive industries which are compatible with community characteristics.

Various possibilities for employment exist in Hari Hari, and these may be based upon diversification of traditional farming practices, utilisation of other natural resources and cottage industries.

8.5.2 Diversification of Agriculture

Possibilities for diversifying and expanding agriculture have been noted in Section 7.1.

8.5.3 - Other Resource Based Activities.

Hari Hari is endowed with a number of natural resources upon which small scale labour intensive

industries could be based.

Natural resources and possibility for use include:

a. Indigenous forests; - wood processing, recreation and tourism;
b. wild game; - game meat, leather and fur products, tourism and recreation;
c. rivers and lakes; - tourism and recreation; and,
d. scenery; - tourism and recreation.

i. Wood processing

Currently there appears to be little prospect for a wood processing industry in Hari Hari. Hari Hari has no advantages over other areas for wood processing. In fact, it is seriously disadvantaged. The current national and international demand for decorative wood products is not high(Nicholson, (pers.comm.).

However, in the future it may be possible to produce products, (such as fence posts) from thinnings of tended exotic or indigenous plantations(James, (pers. comm.).

ii. Game Meat Packing

A meat processing industry exists in Hokitika. Currently this industry is operating well below potential capacity and it is unlikely that further licenses will be granted on the West Coast.

iii. Fur Processing

a. Export demand

The international demand for fur products is rapidly increasing and is expected to continue to increase over the next ten years.

b. National demand

At present national demand is very small and is largely dependent upon overseas tourists visiting New Zealand.

c. The Current Manufacturing industry

Ross Furs is the only company processing opossum fur on the West Coast, and is possibly unique in New Zealand It covers the whole field in the opossum industry from buying skins, exporting raw and processed skins, to manufacturing and exporting processed products. Between August and October 1980 Ross Furs exported over half a million dollars worth of dressed skins and manufactured products. There are other manufacturers in the North and South Islands, but these in general manufacture opossum skins as a side-line to their sheep skin and leather products.

Peter Gray (of Ross Furs) believes that the establishment of one or two more manufacturers producing high quality products would provide New Zealand with a strong base from which a high value export market could be created.

d. Supply of Skins

The present supply of skins is limited to generally low quality skins not required for export. The current export incentive schemes whereby processing firms receive more benefit from the export of raw skins, rather than selling skins to local manufacturers, should be re-evaluated.

Opossum farming could increase the supply of high quality skins. Indeed, if New Zealand is to maintain a reliable and continuing export of high quality skins and processed products, then opossum farming will become necessary.

e. Viability of an Opossum Industry in Hari Hari.

The success of Ross Furs, and the apparent international demand for fur products,clearly points to the possibility for an opossum industry in Hari Hari.

There are two buildings currently available in Hari Hari which are suitable for such an industry. A logical beginning would include dressing and/or dyeing skins. This would increase the value of raw skins by up to $4.50 each. Once expertise in manufacturing and marketing is established, the industry could progress into manufacturing.

An opossum industry, in conjunction with opossum farming, would produce high quality low bulk and distinctive items and would not require large capital investment.

Such an industry would provide substantial employment opportunities in Hari Hari.

However, the establishment of an industry in Hari Hari poses problems of attracting trained and experienced staff, arranging satisfactory freighting and machinery maintenance. Section 8.5.6 discusses means for attracting skilled employment.

COMMENT

New Zealand has exported raw opossum skins for many years. This provides employment for people outside New Zealand but it does not employ many people within New Zealand.

The export value of skins last year was approximately twenty-four million dollars for over three million skins. If these skins were completely processed into garments in New Zealand, they would have a wholesale selling price per skin of not less than $21.00. Thus exports of opossum products could earn between 70 to 100 million dollars for New Zealand, (Gray, (pers.comm).

I believe, that in the future New Zealand should concentrate, wherever possible, on selling finished products rather than exporting raw products.

Data was obtained from Peter Gray, Ross Furs - New Zealand opossum specialists.

iv. Tourism and Recreation

Section 6.5.1 outlines the potential for tourism in Hari Hari as seen by local residents. Experience from other rural districts where local people have set up farm models, farm safari tours and helicopter hunting trips, indicates that there is scope for similar activities in Hari Hari. Recently, a number of people throughout New Zealand have begun to explore the possibilities of operating adventure tours, to places "off the beaten track". Such tours offer tramping, kayaking, rafting, canoeing, horse-riding and sailing experiences (L. Taylor, pers.comm.). These tours may travel around the country or they could be based in one place, such as Hari Hari, which has all the necessary resources close at hand.

An outdoor pursuits centre was suggested for this kind of activity. It is surrounded by mountains for climbing, hunting, forests for bush walking, bird watching, hunting, rivers and lakes for canoeing, rafting, sailing, fishing and swimming, and places for horse trails. An outdoor pursuits centre could attract international tourists, New Zealand holiday-makers and school and other groups.

The establishment and operation of such a centre requires skilled people, some of whom would need to be attracted to Hari Hari. Once established, local people could be trained at the centre.

Hari Hari clearly has potential for tourism and recreation and it is a subject which should be given serious thought.

8.5.4 Cottage Industries

The cottage industry movement is growing in New Zealand, and in many rural districts creates substantial employment. For example, a cottage industry selling a variety of articles from soft toys to knitted garments, bath cleaners to pottery, has been established in Herbert, North Otago. The industry involves 50 suppliers within ten miles of the village. The shop is staffed by twenty people on a voluntary business, Gillies, (1979).

Cottage industries are excellent where people prefer to work at home on crafts such as silversmithing, pottery, spinning, weaving and dyeing, leather work, glass work etc. Bulk buying of raw materials and marketing can be done on a co-operative basis.

These crafts people can form a reservoir of casual labour in the area, available when required - but also able to turn to their own work at any time, Gillies, (1979).

The development of cottage industries in other rural areas of New Zealand has had an important revitalising effect upon local communities. Opportunities to use

skills already acquired, or to learn new skills, and to earn an income are created. These activities enrich the social and cultural environment, and create a sense of local achievement, Gillies, (1979).

8.5.5 Community Self-Sufficiency

Possibilities might exist for the community, either as a co-operative or an individual, to produce its own bread and vegetables. Perhaps the local butcher could re-open.

Many local people mentioned the need for hair dressers and clothes making. Others mentioned the need for somewhere to go out to dinner. Perhaps someone could run a small part-time restaurant.

Opportunities for traditional work such as part-time or full-time plumbers, electricians and carpenters exist in Hari Hari. In the sentiments of Gillies, (1979):

> "It might well pay a number of rural women to obtain the required apprenticeship training, trade certification and registration. This would not only give them employment but would improve the level of servicing in rural areas."

8.5.6 Problems to be Overcome

In Chapter Seven it was suggested that schemes for rural social development are most successful when they are formulated and carried out by local residents.

However, without local initiative these will never happen.

My interviews with local people convinced me that many people have good ideas for alternative employment but few showed any inclination to put them into action.

There is a widespread belief throughout the community that the "Government" will create employment once the mill closes, (Section 7.4.8). But I believe, that, although assistance in the form of advice and monetary incentives is available, the future of Hari Hari is dependent upon the will of the local people.

Skilled people will be needed to establish activities such as a fur industry, an out-door pursuits centre, cottage industries and to diversify agricultural practices. Although some local skill exists, and others could be trained, many people will need to be attracted to Hari Hari. This requires community action. To begin with, many possibilities exist for improving and enhancing both the physical and social environment of Hari Hari. These were identified in Chapter Six (Sections 6.2.1 - 6.4.11.)

For example;

i. The lack of cultural life, mentioned by many local people (Section 6.4.3) could be overcome, if people were willing to hire movie films, or form a drama group, or establish a small restaurant.

ii. The attractiveness of the township could be enhanced, for instance, through maintaining derelict, empty houses, (Plate 32), planting trees, landscaping public buildings etc.

An advertising campaign could be launched to promote the benefits of living in Hari Hari.

The positive attributes of Hari Hari were described in Chapter Six (Sections 6.2.1 - 6.4.11).

These suggestions require little else but community enthusiasm and initiative. I am convinced the people of Hari Hari can live up to their name,

"A song to make people pull together."

8.6 DISCUSSION

The fears expressed by the community in Section 5.4.13, are not borne out in fact. Hari Hari will not "die", the school will not close, and is not likely to decline in standard, and only two part-time jobs for women will be lost.

Closure of the sawmill will have the greatest effect upon the mill population. In Section 6.4.12 it was noted that the majority of the mill population interviewed, indicated that they intend to move within the next four years, regardless of the mill's future. The majority of the sawmill population do not regard

Plate 32. An empty house - centre of township.
(Photo, Sue Maturin)

Hari Hari as home and would prefer to move away. Thus, although the sawmillers will be faced with the difficulty of finding jobs in the near future, in the long term it is probable that they and their families will benefit rather than lose, by being forced to move.

Overcoming the resulting unemployment and population loss, from closure of the mill, provides a challenge and an opportunity for the community to create an environment which is satisfying and attractive for them.

I believe this is possible because there are opportunities for creating a diversity of full-time and part-time jobs in Hari Hari and that these jobs will enhance the social and cultural environment and increase the level of servicing in the district.

In fact, the closing of the sawmill might be a blessing in disguise for Hari Hari. The creation of a diverse range of jobs in businesses which are owned partly or wholly by local people, would provide a stable and diverse population. This population would contribute more to the community than the present sawmill which is owned by an outside company and whose employees contribute little to community activities.

8.7 SUMMARY

The closure of the sawmill will have the following impacts upon the community:

a. Employment will decline by 26 full-time jobs and 2 part-time jobs. Of the full-time jobs lost, two will be replaced by two part-time jobs;
b. population will decline by approximately 58 people;
c. services will be reduced but not lost;
d. of the businesses, only the store is expected to close; and,
e. sports and social clubs will be little affected.

These impacts need never eventuate in Hari Hari providing schemes for alternative employment are initiated immediately. The following possibilities for employment were identified:

a. Agricultural diversification - deer and opossum farming, berry cropping;;
b. a fur industry;
c. tourism and recreation, in particular an outdoor pursuits centre;
d. cottage industries - spinning-weaving, knitting, silver smithing, wood turning and carving etc; and
e. traditional jobs to promote community self sufficiency, e.g. plumbers, bread baking, etc.

However, many of these activities require skilled people, most of whom will need to be locally trained and/or attracted to Hari Hari. People could be

attracted to Hari Hari through an advertising campaign and by improving the physical environment and social conditions.

Chapter Nine

Summary and Conclusions

9.0 SUMMARY

This study has been built around the principle that land use decisions have social and economic implications for human systems, and ecological implications for natural systems. Consequently land use options were examined within the context of community and ecological needs.

From the study of the people of Hari Hari the following needs of the community were identified:

a. A greater range of choice of employment for women and school leavers;
b. maintenance of the present community size;
c. maintenance of the present school;
d. maintenance of the present community activities;
e. maintenance of the present services and businesses; and,
f. more cultural activities.

This list indicates that the present employment activities do not satisfy all the needs of the community. In particular, there is a lack of employment for school leavers, and little choice of employment activities for women.

The study of past and present land use practices highlighted the need for land use to work within the constraints imposed by the natural systems. Only those practices that are the most well adapted to the natural system, offer possibilities for long term sustained and productive use.

The history of farming showed that agriculture is evolving towards greater adaptation to the natural environment.

Farmers have become conscious of the need to maintain and increase pasture quality. Soil nutrient levels are maintained by continuous fertiliser applications and careful grazing patterns. The choice of the kind of stock run, is based on the nature of the land. Where areas are prone to boggy conditions, lighter stock, i.e. sheep or jersey cows, are run in preference to the heavier beef stock and Fresian dairy cows. Many farmers are finding that improving stock performance rather than increasing stock numbers, is more profitable, in terms of financial profit, and maintaining pasture quality.

In the future a greater understanding of the physical and climatic environment will enable agriculture to become better adapted to the natural system.

In contrast, forestry practices have not evolved towards greater adaption to the natural system. The broader aspects of the forest ecosystem are poorly understood, and the long term impact of logging upon forest ecosystem is not known. Present forestry practices do not ensure long term stability of the forest ecosystem. Consequently, future options for sustained use of the forests, are being steadily reduced.

The forest resource continues to be depleted, in the absence of knowledge concerning wildlife habitat requirements. Although the need to ensure adequate representation of forest ecosystems is recognised, it is not known what constitutes "adequate", in terms of wildlife requirements. Therefore we can not be certain that the present and proposed reserves will ensure adequate protection of forest ecosystems. Without this knowledge, future forest management can not be adequately debated.

Future options for land use were outlined and examined for their ability to satisfy the needs of the community and the ecological requirements of the natural systems.

For agriculture, the following options were identified:

a. Continuing as at present;
b. increasing farm management efficiency;
c. developing undeveloped land;
d. clear felling and conversion of state forests for agricultureal production;
e. horticultural production; and,
f. other agricultural diversification.

The options which best meet social and economic and ecological needs are:

a. Continuing as at present;
b. increasing farm management efficiency; and,
c. other agricultural diversification - opossum and deer farming and bee keeping.

For forestry the following options were identified:

a. Continuing to log remaining virgin areas (zoned for production) at present cutting levels;
b. reduction in present cutting levels to meet existing legal commitments;
c. reduction of permissable cut to the level of sustained yield;
d. establishment of an exotic plantation;
e. clear felling of some state forests for agriculture;
f. immediate cessation of production logging; and,
g. replanting cut over areas with native seedlings.

The first two options meet the immediate social and economic needs, but conflict with ecological needs. Options c to e do not meet either the needs of the community, or ecological requirements. Option g, may be adopted in conjunction with all of the above options. However, if ecological needs are to be met there is only one option:
The immediate cessation of production logging. Production logging should cease until the natural constraints are identified and a logging system which works within the constraints is designed.

This option does not meet the social need of maintaining present employment or the economic needs of the sawmillers. However, it would not seriously affect the broader social needs. The businesses and services would not be reduced, although the school role would decline, the standard of education would not be affected. Community activities would not be impaired, as the present sawmill population participates little in these activities.

The reduction in employment could be overcome by the establishment of alternative activities. Possibilities exist for a fur industry, an out-door pursuits centre, and a range of cottage industries. In addition, further employment could be created by a number of ventures which would promote community self-sufficiency, and enhance the level of servicing within the district.

These ventures (which could be either wholly or partially owned by local people) would contribute to the broader community needs. In particular, a more diverse range of employment would help alleviate the present lack of choice of employment for women, and help create jobs for school leavers. These ventures would contribute far more to the local community and economy, than the present saw-milling industry which is owned by an outside company.

The cessation of production logging, accompanied by the establishment of alternative employment, would satisfy the ecological requirements of the natural systems, and contribute to the broader needs of the community.

9.1 CONCLUSIONS

This study provides an example of a multi-disciplinary approach to land use planning. It integrates the social, economic and ecological aspects of forestry and agriculture in the Hari Hari district. Decisions concerning future land use were placed in the context of the social and economic needs of the community, and the ecological requirements of the natural systems. As a result, it was possible to identify future land use options that would satisfy ecological requirements, and alternative ventures that would contribute to the broader needs of the community.

Land use decisions which are not based on the broadest possible aspects of land use can not hope to satisfy the social and economic needs of the human systems, and the ecological needs of the natural systems. To achieve this a multi-disciplinary approach, such as that used for this study, is vital.

The major conclusions of this study are:

a. Agriculture has proved to be a sustainable and productive form of land use;

b. the forest ecosystem is poorly understood, and consequently forestry is not well adapted to the forest ecosystem;

c. the needs of the community are not fully satisfied by present employment activities;

d. any or all of the following options, which satisfy ecological requirements, would contribute to the needs of the community:
   - continuing present agriculture practices;
   - increasing farm management efficiency;
   - diversification into deer and opossum farming; and,
   - cessation of production logging, in conjunction with the establishment of alternative employment opportunities; and,

e. the closure of the mill will have little impact upon Hari Hari other than a reduction in employment.

The present situation concerning forestry is the inevitable consequence of the past and present logging practices, which have used the forest resource in a non-sustainable manner.

If Hari Hari is to be sustained in the long term, it is important that alternative employment opportunities are established now, and that production logging does not continue. If these options are not implemented, Hari Hari faces an inevitable decline in population with little hope for a future timber industry.

The following dictum is particularly appropriate for Hari Hari:

> "Study how a society uses its land, and you can come to some pretty reliable conclusions as to what its future will be."
>
> (Schumacher, 1973, p.100)

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APPENDICES

APPENDIX A PHYSICAL DESCRIPTION OF THE STUDY AREA

I. Geology

West of the Alpine Fault the underlying rocks are largely greywacke, argillites and associated metamorphic rocks. These are mainly overlain by moraine and moranic gravels and alluvial deposits brought from the mountains east of the alpine fault. Among these accumulations are river gravels, sand dunes, swamp deposits and shingle screes. The river gravels of the younger terraces form the fertile farmland of the Wanganui and Poerua river flats. Figure A1 shows the geology of the study area.

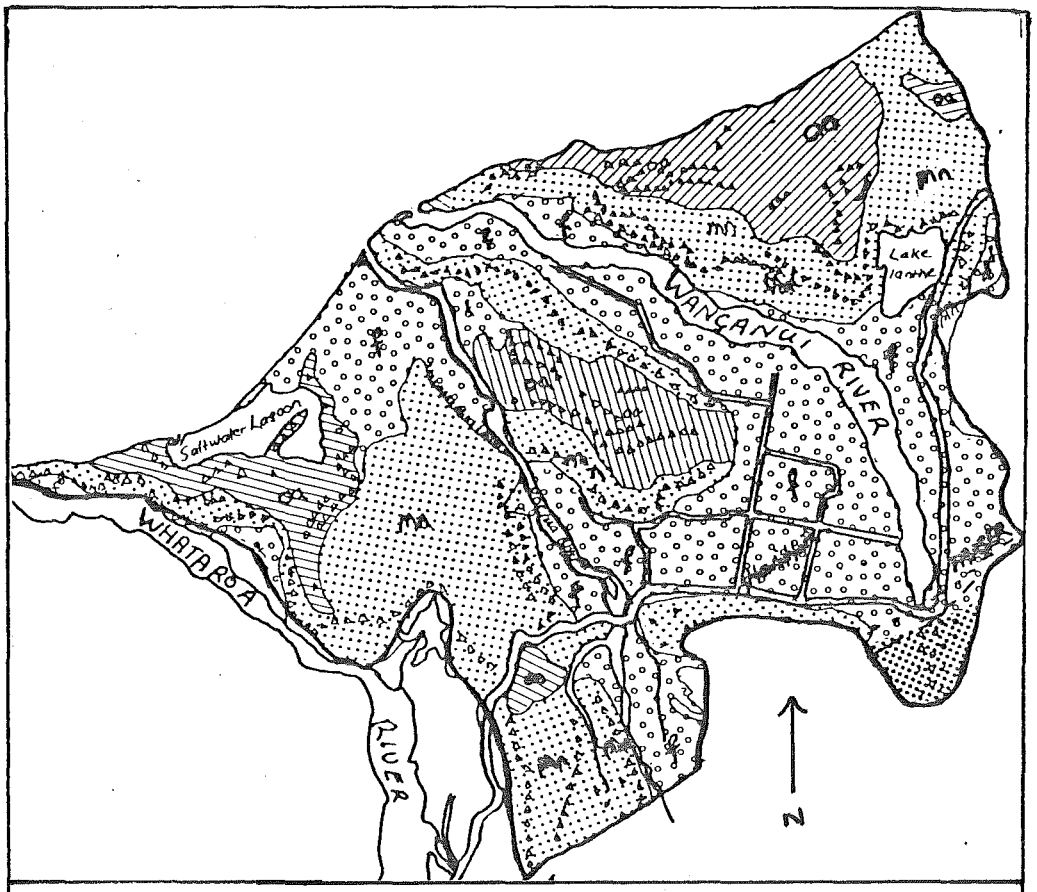
Mineral Deposits

The beaches have black sand deposits which contain ilmenite and non titeniferous magnetite with small quantities of Zircon, garnet and other accessory minerals including gold and sheelite.

II. Climate

The climate of South Westland is characterised by a high annual rainfall which ranges from approximately 2000 mm near the coast to over 8000 - 10,000 mm on the main divide. Rainfall for Hari Hari in 1979 was 4,418 mm with 226 rain days, (Table A1).
There are no regular seasonal periods of rain or drought.

Figure A1. Geology



5 0 5 10 15 20 kms.

GEOLOGICAL LEGEND

River gravel and silt

Little weathered glacial out-wash gravel and till. (Moana formation)

Okarito formation

Garnet Zone - feldspathic biotite schist

Prominent moraine ridge

TABLE A1. AVERAGE MEAN RAINFALL AND TEMPERATURE

Year	Lowest Monthly Temp.	Highest Monthly Temp.	Rain mm	Raindays
1974	July 6.3	Feb 17.7	2203	172
1975	June 4.3	Feb 16.1	3921	211
1976	July 5.7	Jan 18.0	4278	202
1977	June 6.8	Feb 15.7	2927	196
1978	June 5.9	Feb 16.5	3828	172
1979	June 7.3	Feb 14.8	4418	226

Source: N.Z. Meterological Service.

There is a regular movement of high pressure air masses and fronts, usually fast moving, which result in heavy regular rain and bright warm regular sunshine.

The prevailing winds are westerlies and south westerlies. An easterly gale, known locally as the "gorger" occurs on average six times a year in late spring.

Light frosts occur on average on 94.6 days a year.

Temperatures range from a winter average of 6.0°C to a summer average of 16.5°C.

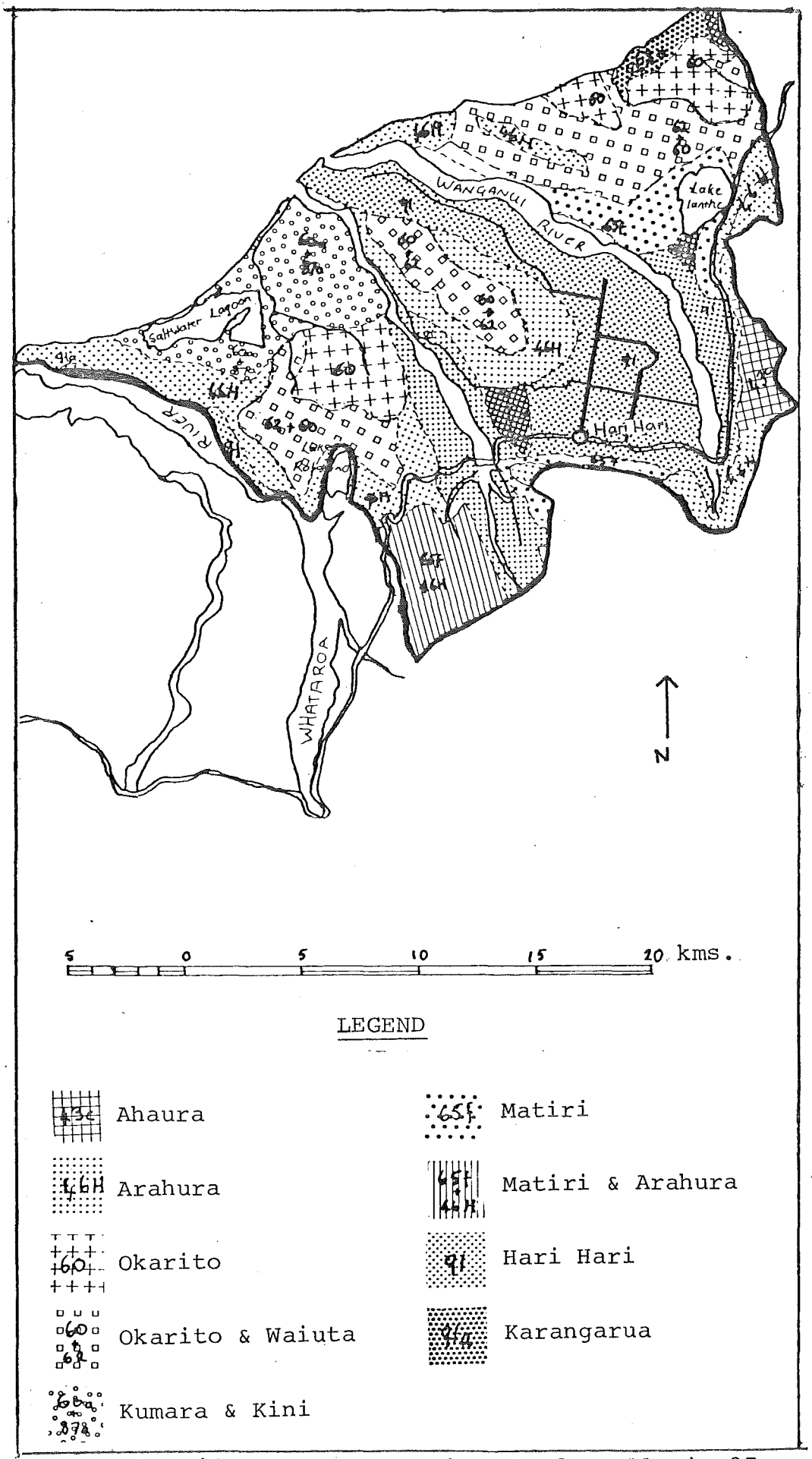
III. Soils

Soil information is provided by the New Zealand General Soil Survey map of the South Island at a scale of 1:253,440.

The soil sets found in the Hari Hari district, (Fig.A2), fall into the following seven groups.

Landscape type	Genetic group	Soil series
River flats	Gley recent	Hari Hari Karangarua
Terraces	Lowland podzolised Y.B.E.	Okarito Kumara Waiuta
	Organic soils	Kini

Figure A2. Soils.



Source: General Soil survey of South Island, Bulletin 27.

Terraces, rolling land	Lowland Y.B.E.	Arahura Hill
Hill country		
Hill country	Upland and high country podzolised Y.B.E.	Matiri steepland

A. RIVER FLATS

i. Gley Recent Soils

Gley recent soils occur adjacent to flood plains where in recent times alluvium from greywacke and shist has accumulated. These soils are young and show only slight profile development. Profiles show weakly developed gley features, hard pans and cemented layers are absent. Gley recent soils generally overlie porous gravels and sands, as a result they are easier to drain than gley soils. In dry summers these soils may dry out, and there is a need for controlled drainage to regulate the water tables. Conversely gley soils may also be water logged for long periods. When gley recent soils have been drained, they may be used for cropping, market gardening and other intensive purposes. Two main soils series belong to this group, Hari Hari and Karangura.

ii. Hari Hari Fine Sandy Loam

This soil is a slow draining, structureless fine sandy loam. It occupies extensive areas of the Hari Hari flats adjacent to the Wanganui and Poerua rivers and is the soil most extensively developed for farming.

The Hari Hari soils are strongly acidic, have low base saturation values, with medium C/N ratios and are of medium fertility. They have medium amounts of exchangeable cations making them suitable for growing crops.

Potential uses include intensive dairy and cattle farming and farm forestry. They respond well to lime and superphosphate and moderate success with molybdenum may be expected.

iii. Karangarua Sandy Loams

A poorly drained structureless sandy loam. They occupy small areas on the Wanganui and Poerua river flats. They are strongly acidic and have medium to low fertility. Karangarua soils are capable of intensive dairy and cattle production and indigenous forestry. They respond well to superphosphate and lime.

B. LOW TERRACES

Lowland Podzolised Y.B.E.

Where rainfall exceeds 127 mm and where mor forming forest vegetation occurs, yellow brown earths grade into podzolised Y.B.E. Waterlogging is a characteristic feature of these soils and occurs with the development of iron pans (or humus), which prevents soil water drainage.

These soils typically support podocarp/hardwood associations which produce an acid litter. Because base saturation and nitrogen contents are low, litter

accumulation is greater than decomposition of organic matter.

In regions where precipitation, for the greater part of the year exceeds losses of soils, moisture by evaporation and transpiration the process of podzolisation is accompanied by intensive gleying. Gleying normally occurs on flattish sites in soil of weak topsoil structure and an impervious substratum. These conditions lead to water logging, as water drains very slowly if at all, through the mineral layers, Vucetich (1960).

The slow movement of water through the soil impedes the development of these soils for exotic forestry and agriculture. Where these soils are still in forest they may be suitable for sustained yield management of timber, but where forest has been cleared the land becomes more swampy and is difficult to reclaim for either agriculture or forestry. Utilisation of podzolised Y.B.E. and podzols is influenced by the soil moisture regime which depends on the age of the soil nature of the slope and rainfall.

i. Okarito Loam

This soil is mainly derived from alluvium from greywacke and shist. Okarito soils occupy large areas of Ianthe State Forest and an area of low terraces in Saltwater State Forest. They appear to be largely absent from Wanganui State Forest. These soils are

very poor draining and are extremely acid with low base saturation levels and a very high C/N ratio. They are very low in fertility and have medium amounts of exchangeable cations in the topsoil, but the amount declines down the soil profile until there are none or very low amounts of exchangeable cations.

ii. Kumara Loam

Kumara loam occupies extensive areas of Saltwater State Forest, parts of Ianthe State Forest and is absent from Wanganui State Forest. It is derived from alluvium from greywacke like the okarito soils it is extremely acid having a low base saturation due to intense leaching. The C/N ratio is high indicating low fertility. Drainage is impeded by the presence of iron pans. Potential uses include forest reserves, commercial indigenous and exotic forestry and waste-lands. They are not suitable for agriculture.

iii. Waiuta Fine Sandy Loam

A strongly leached podzolised Y.B.E. occupying an extensive area of Ianthe, a large area of Wanganui State Forest and a large area in Saltwater State Forest along the banks of the Whataroa River. It is found on glacial till and outwash from greywacke. This soil is slow draining, is extremely acid and has low levels of base saturation being a strongly leached soil the C/N ratio is very high indicating low fertility. The amount of exchangeable cations is medium in the topsoil and decreases to low amounts in the subsoil.

Limited pasture development is possible using heavy fertiliser dressings.

Waiuta soils respond well to superphosphate and lime. These soils are capable of being used for semi intensive sheep and cattle farming, indigenous and exotic forestry.

C. ORGANIC SOILS

These soils are of limited extent. Organic soils are formed on decomposed or partly decomposed residues, where water tables are high.

Kini soils peats and peaty loams.
Kini soils are found in a small area of Saltwater and Wanganui State Forest. They are formed under rimu/ kahikatea and silver and bog pines. Drainage is very poor and they have very low fertility. Suitable only for forest reserves or indigenous forestry.

D. LOWLAND YELLOW BROWN EARTH

These soils are found covering a large area of Ianthe State Forest, small areas of Wanganui and Saltwater State Forest. Some lowland Y.B.E. occur on fans at the foot of Mt. Bonar and Wilberg ranges. The lowland Y.B.E. are confined to the young soils of the low terraces, or to the hill slopes, where soil mixing tends to offset development of podzols.

Hydrous to hygrous lowland Y.B.E. occur in areas which have a rainfall between 127 - 381 mm per annum. Under hydrous conditions some surface gleying occurs in the

top soils. Generally lowland Y.B.E. lie adjacent to the podzolised Y.B.E. and may in time become podzolised. The soils are mostly deep and free draining, and are usually strongly leached.

These soils have a range from low to high amounts of total phosphorous, the bulk of which is unavailable forms.

i. Arahura Hill Soils

These soils are shallow and are strongly leached. Arahura hill soils are formed on greywacke and shist gravels and glacial till. They are found on moderately steep and rolling hill country areas of Wanganui, Ianthe and Saltwater State Forests.

These soils are poorly drained and fertility is low. They are liable to severe sheet and slip erosion if the forests are cleared. Potential uses include commercial indigenous forestry and exotic forestry.

E. HILL COUNTRY

Upland and High Country Podzolised Y.B.E.

These soils are not widespread in the study area, occurring in the steep hills of Ianthe, Wanganui and Poerua State Forests. Many of the features described above, (lowland podzolised Y.B.E.) are also characteristic of these soils. The main differences being due to the higher altitude and lower temperatures.

This means that they are weakly weathered and have lower production and turnover of organic matter. Because of the liability to erosion these soils should remain forests for water conservation and flood control.

i. Matiri Steeplands

These soils are sandy silt and stony loams, and are developed on sand stones and conglomerates. Matiri soils are freely drained, strongly leached acidic soils with low fertility. They are prone to slips where destruction of the vegetation occurs. They are suitable for protection forestry only.

IV. Soil Erosion.

An erosion map, 1:250,000 derived from data on lithology, soils, slopes, erosion, vegetation and land use, obtained from the Land Resource Inventory Work Sheets is available for the study area.

The degree of potential erosion has been assessed according to average management, i.e. management without specific conservation practices.

Most of the rolling terraces do not have significant erosion potential. The coastal strip in Ianthe is assessed as having slight erosion potential and the hill areas have moderate sheet erosion potential.

Areas adjacent to the Poerua and Wanganui Rivers have moderate stream bank erosion. Stream bank erosion along the northern bank of the Wanganui River is severe and much good farmland has been lost to the river, similarly along the bank of the La Fontaine Stream.

V. Major Forest Types

Generally the study area is covered by dense podacarp forests in which rimu is dominant.

A. Terrace Forests

Rimu forms the canopy species at 30 m or more. Miro is much less abundant and not as tall, and there are occasional trees of Halls Totara. Kamahi is abundant though mostly as young poles, few trees reaching their potential height and girth. Quintinia is usually common. Rata occurs locally in better drained sites.

The shrub story consists mainly of Neomyrtus pedunculata, with Dicksonia squarrosa, Phyllocladus alpinus, Myrsine divaricata, Pseudopanax colensoi, Coprosma foetidissima and C. lucida occurring in most stands.

Herbs usually give only a sparse cover. Blechnum capense is the main species. Astelia nervosa is present in most stands. Epiphtes and lianes are minor features of the type. Bryophytes usually form a complete carpet except where there are pools, Wardle (1976).

B. Hill Forests

In these forests there are scattered rimu standing above a canopy dominated by rata, kamahi and quintinia. Occasional miro, matai and totara are present.

Hill forest is characterised by;

a. Rolling to moderately steap topography.
b. Good drainage compared with the terrace lands.
c. Low stand volumes and stem densities. The average stand volume is about 150 m^3/ha.
d. Large average size of podocarps. Individual stems grow faster than on the terraces and reach a larger size.
e. A more significant hardwood canopy.
f. Podocarp regeneration is sparse.

These factors together severely limit the potential of hill forests for sustained yield management.

C. Silver Pine Forest

Silver pine is present as;

a. A narrow fringe around swampland.
b. Pure stands in wet depressions.
c. Scattered trees.
d. Scattered trees in rimu dominant forest.

In the past, silver pine has been extensively logged for posts. The second stand type offers the only possibility for selection logging. (N.Z.Forest Service, 1980).

APPENDIX B ACCURACY OF THE SOIL SURVEY

The general soil survey has been updated in the Inangahua depression to produce maps of 1:50,000. As a result of the more detailed surveys many more soil sets than originally mapped were identified. Increased access, a better knowledge of soil parent materials, more detailed recognition of vegetation types and profile morphology are chiefly responsible for the changes. In many cases the properties of the newly defined series, as related to exotic forest growth, were found to be markedly differing from the original soil sets thus requiring refinement to the original land use plans. Mew, et.al., (1977).

The provisional results of the current soil survey in the Hari Hari district indicate that similar changes will be made to the general soil survey for this area, as outlined below.

LOW TERRACES

General survey	Current survey
Podzolised - Gleyed Y.B.E.	Gleys Humic Gleys Podzolised gleys

ROLLING HILL COUNTRY

General survey	Current survey
Lowland Y.B.E. Some gleys	Gleys Gleyed Y.B.E. Y.B.E.

HILL COUNTRY

General survey	Current survey
Podzolised Y.B.E.	Podzolised gleys Humic gleys Gleys, Y.B.E. steepland

The provisional results of this survey suggest that Gley podzols originally mapped as Okarito and Kumara are more gleyed than podzolised. The podzolised gleys of the current survey have iron pans high in the profile and are gleyed both above and below. They are uncommon in the Hari Hari district.

Waiuta soils are not present, but the Flagstaff soils now regarded as gleys, are probably equivalent.

Gleys and Humic gleys have high water tables and are generally wet and "mushy". Humic gleys are heavily stained with organic matter.

Few Y.B.E. were found, these are approximately equivalent to the Y.B.E. of the Arahura set, but the new series show slight gleying. According to this survey the dominant soils of the Hari Hari district are as follows; on flat lands and rolling terraces, gleys and humic gleys are the most common and on the hills, Y.B.E., Gleyed Y.B.E., gleys (flaggstaff type) and podzolised gleys are the dominant soils.

The proportions of humic gleys soils and gley soils without iron pans are higher than recognised by the general survey. These provisional results suggest that the general soil survey is not an adequate reference base for detailed land use planning. The above survey deals with soils in relation to growth of pinus radiata and does not include data on other

land uses. Unlike previous surveys, this survey does not include analysis of soil chemical properties.

With such a narrow interpretation, this survey will not be adequate for full environmental appraisal of indigenous and exotic forestry.

APPENDIX C. THE LAND RESOURCE INVENTORY WORK SHEETS

In New Zealand an eight class standard land use capability system has been developed. This involves the assessments of the inherent characteristic of the land and their assemblage into land resource inventory sheets, on which are delineated many distinct land inventory units. The units provide basic information for the detailed planning of land use, Ministry of Works (1974).

Land use is assessed according to the degree of physical limitations of the land for production, Ministry of Works (1974).

The soil data for these maps is based on the general soil survey. To adapt this soil information to the scale of the inventory sheets, the general soil maps were enlarged from 1:235,440 to 1:63,360. Hence these maps do not provide an extension to existing soil data, and should not be used for district planning purposes without reference to the original soil maps, for such an enlargement is a gross misinterpretation of the soil data, Cutler,(1977).

APPENDIX D

Questions to help with Research on the Hari Hari Community for 4th, 5th, 6th and 7th Form pupils.

Please could you answer the following questions. You may write as much as you wish up to three A4 sides.

1. Age
2. Class
3. Male/female
4. What do your parents do (i.e. occupation)
5. How long have you lived in Hari Hari?
6. Do you enjoy living in Hari Hari?
   What are the things you like about living here?
7. What kind of things do you do in your spare time.
8. What kind of changes would you like to see happen in Hari Hari. What things would make Hari Hari a better place to live in?
9. What are the things that you do not like about Hari Hari.
10. What do you think you would like to do when you leave school?
    a. Job?
    b. Where you would like to live?
    c. If you leave Hari Hari, do you think you will come back to live?
    d. If there were suitable jobs for you here, do you think you would stay here?
    e. What kind of jobs would you like to get here? (Suggestions for future employment opportunity in Hari Hari).

Appendix D (continued)

11. What do you think about conservation, and what do you understand by the word conservation?

APPENDIX E ESTIMATED 1980 POPULATION

	1976
Total population	693
Population employed full time	273
Retired population	8
Social Welfare beneficiaries	2
Non earning dependents	410
Per employee	1.502

1980 full time employment = 218

This is 55 less than 1976

Estimated population 55 x 1.5 = 610

APPENDIX F

Sports clubs	Organisations
Squash	Presbyterian Church guild
Swimming	Anglican Church guild
Athletics	Country Women's Institute
Bowls	Play Centre Committee
Indoor basketball	Plunket
Netball	Girl Guides
Rugby	Scouts
Badminton	Brownies
Tennis	Cubs
Mountain Safety	St. Johns Ambulance
Gun	Fire Brigade
Axemans	School Committee
Hockey	Parent Teachers' Association
Pony	Church youth group
	Federated Farmers
	Farmers Discussion group
	Wooly West Coasters